

Falls on Crowness River near Lundbreck, Alta.

DEPARTMENT OF THE INTERIOR

DOMINION OF CANADA.

REPORT

OF

PROGRESS OF STREAM MEASUREMENTS

FOR

THE CALENDAR YEAR 1910

BY

P. M. SAUDER, C. E.

PRINTED BY ORDER OF PARLIAMENT



OTTAWA

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*To His Excellency, the Right Honourable Sir Albert Henry George, Earl Grey, G.C.M.G., &c.,
Governor-General of Canada.*

MAY IT PLEASE YOUR EXCELLENCY.

The undersigned has the honour to lay before your Excellency the report of the progress of Stream Measurements for the year 1910.

Respectfully submitted,

FRANK OLIVER,
Minister of the Interior.

OTTAWA, July 4, 1911.

The following table shows the results of the work done during the year 1911. The work was done in the following order: first, the work done in the field; second, the work done in the laboratory; and third, the work done in the office. The results of the work done in the field are given in the following table:

Field	Area	Area (sq. miles)	Area (sq. miles)
Field	Area	Area (sq. miles)	Area (sq. miles)

The results of the work done in the laboratory are given in the following table:

Laboratory	Area	Area (sq. miles)	Area (sq. miles)
Laboratory	Area	Area (sq. miles)	Area (sq. miles)

The results of the work done in the office are given in the following table:

Office	Area	Area (sq. miles)	Area (sq. miles)
Office	Area	Area (sq. miles)	Area (sq. miles)

DEPARTMENT OF THE INTERIOR,
OTTAWA, July 3, 1911.

The Honourable FRANK OLIVER,
Minister of the Interior.

SIR:—

I have the honour to submit the report of Stream Measurements for the year 1910, and to recommend that it be published as the second of a series of progress reports.

I have the honour to be, Sir,
Your obedient servant,

W. W. CORY,
Deputy of the Minister of the Interior.

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FORESTRY AND IRRIGATION BRANCH,
Department of the Interior,
OTTAWA, June 30, 1911.

W. W. CORY, ESQ., C.M.G.,
Deputy Minister of the Interior.

SIR:—

I beg to submit herewith the progress report of Stream Measurements for the year 1910, submitted by Mr. P. M. Sauder, C.E., and would recommend that it be published, and that a sufficient number of copies be printed to permit of its being widely distributed among those interested in the question of the water supply of Western Canada.

Respectfully submitted,

R. H. CAMPBELL,
Superintendent of Forestry and Irrigation.

DEPARTMENT OF THE INTERIOR,
IRRIGATION OFFICE,

CALGARY, ALTA., June 4th, 1911.

SIR,—

I transmit herewith the manuscript of the Report of Progress of Stream Measurements for the Calendar Year, 1910.

In this report is given a brief outline of the methods of obtaining and compiling the data contained therein, but owing to the want of space and time many of the details had to be omitted. It gives in a tabulated form the records of stream flow during 1910, and all discharge measurements made by the irrigation surveys which were not published in the Report of Progress of Stream Measurements for the Calendar Year 1909.

I request that this manuscript be published as the second of a series of Reports of Progress of Stream Measurements.

Respectfully submitted,

P. M. SAUDER,
Chief Hydrographer.

R. H. CAMPBELL, Esq.,
Superintendent of Forestry and Irrigation,
Department of the Interior,
OTTAWA.

REPORT

ON THE

PROGRESS OF STREAM MEASUREMENTS FOR THE CALENDAR YEAR 1910.

By P. M. SAUDER.

INTRODUCTION.

ORGANIZATION AND SCOPE OF WORK.

Water is an all-essential resource upon which the habitability of our country depends, and the steady growth of population and the general development of science and industry have given rise to an increasing demand for it. In the arid and semi-arid regions, the limit of agricultural development is determined to a considerable extent by the amount of water available for irrigation, while in all parts of the country the increase in the population of cities and towns makes necessary, additional water supply for domestic and industrial uses. The notable advances made in electric transmission of power have led to the utilization of water powers for the operation of manufacturing establishments, railroads, and municipal lighting plants, many of which are some distance from the places at which the power is developed.

The usefulness of the hydrographic work is legion, but among the most important information obtained are the following:

- (1.) General information relating to and governing the flow of surface waters.
- (2.) The magnitude of floods and the minimum flow of streams.
- (3.) The formation and profile of river beds.
- (4.) The effect of very dry or very wet seasons on the country's water supply.

This information is obtained by a series of observations at regular gauging stations which are established at various points. The selection of sites for these gauging stations and their maintenance depend largely on the physical features and needs of the locality. If water is to be used for irrigation purposes the summer flow receives special attention; where it is required for power purposes, it becomes necessary to determine the minimum flow; if water is to be stored, information is obtained regarding the maximum flow. In all cases the duration of the different stages of the streams is noted. Throughout the country gauging stations are maintained for general statistical purposes, to show the conditions existing through long periods. They are also used as primary stations, and their records in connection with short series of measurements will serve as bases for estimating the flow at other points in the drainage basin.

As the result of an increased appropriation this work was greatly extended during the past year. Considerable reconnaissance work was done, and a number of new gauging stations were established. In the spring of 1910, field operations were commenced with 68 regular stations, and at present the regimen of flow is being studied at 98 regular stations distributed along the various streams in Southern Alberta and Saskatchewan.

The methods of carrying on the survey were similar to those of the previous year. Local residents were engaged to observe the gauge height at regular gauging stations. These observations were recorded in a book supplied by the survey and at the end of each week the observer copied the week's records on a postal card which was sent to the Chief Hydrographer by the first convenient mail. The district hydrographers made regular visits to the gauging stations usually once in every three or four weeks. They examined the observers' records, and collected such information as would be of use in making estimates of the daily flow at the station. The results of the gaugings were transmitted to the Chief Hydrographer by a postal card. The reports of the gauge height observers and the hydrographers were copied from the postal cards to regular forms in the office of the survey and filed. At the close of the season, the engineers returned to the office and made the final computations and estimates of discharge and run-off. Gauge height-area, gauge height-mean velocity, and gauge height-discharge curves were plotted, and tables of mean daily gauge height, daily discharge, and monthly discharge were then compiled. These are embodied in this report.

The organization in 1910, was very similar to that of the previous year. The territory covered by the survey was very much increased during the year, and the staff was therefore increased to include eight assistant engineers, a clerk and a draftsman. The irrigation tract was divided for administrative purposes, into five districts; viz: Calgary, Macleod, Milk River, Maple Creek, and Moose Jaw, and in each district there was one or two hydrographers. Each hydrographer had at least one assistant and was equipped with a team, light waggon, light camping outfit, and the necessary gauging and surveying instruments.

CALGARY DISTRICT.

J. C. Keith, a graduate of the School of Practical Science, who had previous experience with the survey as an assistant was placed in charge of the field work in this district. He commenced his duties about the 5th of May.

The district was fairly well reconnoitered in 1909 but the proposed regular stations had not all been established. Regular gaugings were therefore made at these stations which were already established and new stations were added from time to time during the season, as opportunity afforded itself.

Records were obtained at the following regular stations during 1910:—

- Bow River at Banff.
- Bow River at Calgary.
- Bow River near Namaka.
- C. P. R. Co. Canal near Calgary.
- Elbow River at Calgary.
- Fish Creek near Priddis.
- Highwood River at High River.
- Jumpingpound Creek near Jumping Pound P.O.
- Mosquito Creek near Nanton.
- Nanton Creek near Nanton.
- North Branch of Sheep River at Millarville,
- South Branch of Sheep River near Black Diamond.
- Sheep River near Okotoks.

The following gauging stations were established during 1910, and records were obtained at them from the time they were established until the end of October:—

- Bow River near Laggan.
- Bow River near Morley.
- Devils Creek near Bankhead.
- Little Bow Ditch at High River.
- Red Deer River near Innisfail.
- Spray River near Banff.

At the end of September Mr. Keith was granted leave of absence for five months to return to the School of Practical Science to take a post graduate course in Hydraulics and Theory of Construction. Mr. Carscallen was therefore placed in charge of the field work in this district on the first of October.

Early in November when additional funds were provided it was arranged to continue field work in this district during the winter and records of the flow were obtained from that date to the end of the year at the following regular stations:—

- Bow River near Laggan.
- Bow River at Banff.
- Bow River near Morley.
- Bow River at Calgary.
- Devils Creek near Bankhead.
- Elbow River at Calgary.
- Spray River near Banff.

A large number of miscellaneous measurements of the discharge of tributaries of Bow River and other streams in this district were also made during the year, and will be valuable as general information.

I was assisted in the final computations and report for this district by H. R. Carscallen and H. C. Ritchie.

Records of the flow of Bow River are of very great importance. A study of the flow of this stream indicates that the whole of the normal flow has already been granted for irrigation purposes, and any future development must be based on the storage of high water and flood flow. Already this river is being harnessed for power and as industries increase and a large market is created, there will be more power development. For this purpose records of minimum flow are essential. Minimum flow occurs during the winter season, and the records obtained

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during the past winter are very valuable. The flow was however somewhat less than anticipated and it is very important that further studies be made. The regimen of flow in Bow River at Calgary varies from 700 sec. ft. in midwinter to an estimated 60,000 sec. ft. at extreme flood stages. There are a number of feasible storage sites in the mountains which can be utilized to augment the winter flow sufficiently to keep up a continuous flow several hundred sec. ft. higher than the natural minimum flow. Bow River is by far the most important stream in the irrigation tract and a comprehensive study of the hydrography of this stream and its tributaries is of direct value in the commercial and agricultural development of the country. I am also of the opinion that one engineer should spend all his time on the main stream and its immediate tributaries.

I would also suggest that the Calgary district be extended to include Red Deer River and its tributaries and that two hydrographers be placed in this district at an early date. As soon as time and funds permit regular stations should also be established on branches of Highwood River and included in the district.

MACLEOD DISTRICT.

H. C. Ritchie, graduate of the School of Practical Science, was in charge of the field work in this district in 1909 and again in 1910. The district has been fairly well reconnoitered by both Mr. Ritchie and myself and gauging stations have been established at almost all the important points. Oldman River and its tributaries are very important and several additional gauging stations were established on these streams during the past year.

Records were obtained at the following regular stations during 1910:—

Belly River near Stand Off.
 Connelly Creek near Lundbrek.
 Cow Creek at Ross' Rancho.
 Crooked Creek near Waterton Mills.
 Crowsnest River near Lundbrek.
 Mami Creek at Mountain View.
 Muddypound Creek near Cowley.
 Pincher Creek at Pincher Creek.
 Southfork River near Cowley.
 Todd Creek at Cecil Elton's Rancho.
 Trout Creek at Stevenson's Farm.
 Waterton River at Waterton Mills.
 Willow Creek near Macleod.

The following gauging stations were established during 1910, and records were obtained at them from the time they were established until the end of October.

Canyon Creek near Mountain Mill.
 Crowsnest River near Frank.
 Crowsnest River near Coleman.
 Mill Creek near Mountain Mill.
 Oldman River near Macleod.

A large number of miscellaneous measurements which will be very valuable as general information were also made by Mr. Ritchie during the year.

About the first of December when additional funds were provided it was arranged to carry on field work in this district during the winter. W. H. Greene was placed in charge of the field work in this district during December, January and February. During the month of March Mr. Greene was employed in reconnaissance work on North Saskatchewan River and J. E. Degnan was in charge of the field work in the Macleod district during the month of March.

Winter records were obtained at the following regular stations:—

Crowsnest River near Frank.
 Crowsnest River near Lundbrek.
 Oldman River near Cowley.
 Southfork River near Cowley.
 St. Mary River at Kimball.
 Waterton River at Waterton Mills.
 Belly River near Stand Off.

I was assisted in the final computations and report of the work in this district by H. C. Ritchie and Jos. Cawthorn.

Mr. Ritchie did not use a camp at all last summer, and many of the gauging stations can be reached by train. It is proposed to include the stations on Belly and Waterton Rivers in the Western Milk River District in future. The engineer in charge of the Macleod district can then

travel by train and hire liveries by the day. His monthly expenses will be a little higher than formerly but he will accomplish a great deal more work and the actual cost of the individual gaugings will be less.

It is very important that winter observations should be continued in this district.

MILK RIVER DISTRICT.

F. H. Peters, C.E., D.L.S., who was engaged on special investigations on Milk and St. Mary Rivers, also had charge of the hydrographic work on these two rivers and their tributaries. In 1909, Mr. Peters and the writer reconnoitred most of the district and established almost all the gauging stations necessary to obtain complete records of the flow of these two streams. Therefore, only a few new stations were established during 1910, but very complete records of the flow at the regular stations were obtained.

One engineer could not cover the whole of this district and it was therefore divided, and two engineers were employed on hydrographic work. L. J. Gleeson, B.Sc., was in charge of the field work in the western portion of the district and N. M. Sutherland, graduate of the Royal Military College, was in charge of the field work in the eastern portion of the district.

Records were obtained at the following regular stations during 1910:—

- Lee Creek at Cardston.
- Lodge Creek at Willow Creek Police Detachment.
- North Branch of Milk River at Peter's Rancho.
- North Branch of Milk River at Knight's Rancho.
- North Branch of Milk River at Mackie's Rancho.
- Milk River at Milk River.
- Milk River at Writing-on-Stone Police Detachment.
- Milk River at Pendant d'Oreille Police Detachment.
- Milk River at Spencer's Lower Rancho.
- South Branch of Milk River at Mackie's Rancho.
- St. Mary River at Kimball.
- Sage Creek at Wild Horse Police Detachment.

The following gauging stations were established during 1910, and records were obtained at these from the time they were established until the end of October:—

- A. R. & I. Canal near Kimball.
- Battle Creek at Nash's Rancho.
- Frenchman River at Huff's Rancho.

A large number of miscellaneous discharge measurements were also made during 1910, which will be valuable as general information.

The work in the western end of this district is not very heavy and it is therefore being arranged to have the engineer in this portion of the district include Belly and Waterton Rivers in his route, so as to make a more equal division of the territory, and relieve the engineer in the Macleod district of a long drive from Macleod.

CYPRESS HILLS DISTRICT.

A large irrigation development in the Cypress Hills has caused urgent need for very complete records of the flow of the streams in this district. In 1909 H. R. Carscallen, B.A.Sc., was in charge of the field work in this district and established a large number of regular gauging stations. In the spring of 1910 it was realized that one engineer could not cover the whole of this district and it was therefore divided by a north and south line into two districts. The eastern district was fairly well reconnoitered by Mr. Carscallen in 1909, and almost all the necessary gauging stations were established during that year. There was, however, considerable reconnaissance work to be done in the Western district and only a few regular stations had been established. Mr. Carscallen was, therefore, placed in charge of the field work in the Western portion of the district, and R. G. Swan, B.A.Sc., was engaged to take charge of the field work in the Eastern portion of the district. Mr. Carscallen commenced field work about the 1st of April and Mr. Swan about the 10th of May.

Records were obtained at the following regular stations during 1910:—

- Battle Creek at Tenmile Police Detachment.
- Bear Creek near Unsworth's Rancho.
- East Branch of Bear Creek at Johnson's Rancho.
- West Branch of Bear Creek at Bertram's Rancho.
- Belanger Creek at Garrison's Rancho.
- Blacktail Creek at Garrisiere's Rancho.
- Bone Creek at Lewis Rancho.
- Bridge Creek near Skull Creek.

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Bullshead Creek near Dunmore Junction.
 Davis Creek at Drury's Rancho.
 Enright and Strong's Ditch near East End.
 Fairwell Creek at Bolton's Rancho.
 Frenchman River near East End.
 Gap Creek at Small's Rancho.
 Hay Creek at Fauquier's Rancho.
 Jones Coulee at Read's Rancho.
 Lonepine Creek at Hewitt's Rancho.
 Maple Creek at Maple Creek.
 Middle Creek at Ross' Rancho.
 Mackay Creek at Walsh.
 McShane Creek at Small's Rancho.
 Oxarart Creek at Wylie's Rancho.
 Piapot Creek at Cumberland's Rancho.
 North Branch of Frenchman River at Cross' Rancho.
 Ross Creek at Irvine.
 Sixmile Coulee at Soderstrom's Rancho.
 Skull Creek near Skull Creek P.O.
 Sucker Creek at Whitecomb and Zeigler's Rancho.
 Swift-Current Creek at Pollock's Rancho.
 Tenmile Creek at Tenmile Police Detachment.

The following gauging stations were established during 1910, and records were obtained for part of the year:—

Battle Creek at Wilson's Rancho.
 Boxelder Creek near Walsh.
 Gap Creek near Maple Creek.
 Lindner's Ditch near Battle Creek P.O.
 Manyberries Creek at Hooper and Huckvale's Rancho.
 Maple Creek near Maple Creek.
 Middle Creek at Hammond's Rancho.
 Middle Creek at McKinnon's Rancho.
 Sevenpersons River at Medicine Hat.
 Swift-Current Creek at Sinclair's Rancho (upper station).
 Swift-Current Creek at Sinclair's Rancho (lower station).
 Swift-Current Creek at Swift Current.

A large number of miscellaneous measurements were also made for purposes of general information.

About the latter part of September, owing to Mr. Keith leaving temporarily, and for purposes of economy. Mr. Carscallen was placed in charge of the Calgary District and Mr. Swan took charge of the field work in the whole of the Cypress Hills District.

Mr. Swan resigned about the end of November and I was assisted in the final computations and estimates of daily discharge by Messrs. H. R. Carscallen and G. H. Whyte.

There is still a portion of this district which is not covered by the survey. A reconnaissance of the country surrounding Old Fort Walsh and including the heads of Battle, Lodge, Mackay, Ross, and Bullshead Creeks will be made during the present year.

MOOSEJAW DISTRICT.

For some time it has been realized that as the country becomes more thickly populated and the towns spring up there are portions of the West which will not have a sufficient water supply for domestic and industrial purposes.

The Council and Board of Trade of Moosejaw for 1909, were among the first to realize that while there is a sufficient water supply in the district, it is allowed to run off into the larger rivers, in the freshets, and the district is left with an inadequate supply during the remainder of the year. They petitioned the Government to investigate and report on the resources of the Moosejaw Creek and the best methods for the development of same.

This work was undertaken early in the spring of 1910, and a survey party was organized, with Chas. M. Teasdale, D.L.S., in charge, to make a hydrographic and topographic survey of Moosejaw Creek. About the first of May Mr. Teasdale resigned. Mr. W. H. Greene, a graduate of the S.P.S., was then placed in charge of the field party and M. H. French was engaged as assistant.

Two gauging stations were established on the creek; one at a bridge on the N.W. $\frac{1}{4}$ Sec. 16, Tp. 16, Rge. 26 W. 2 M; and the other at a bridge on the road allowance between Secs. 14 and 15, Tp. 15, Rge. 25, W. 2nd Mer. Daily records were obtained at these stations, and the total annual run-off computed. A careful stadia survey was made of the valley from Moosejaw to a point a few miles above Rouleau, and a map showing the configuration of the surface of the ground by con-

tours of 10 foot intervals, was prepared. While the topographic survey was in progress, a careful reconnaissance was made to discover the most inviting places for the locations of dams and reservoirs. Cross-sections were taken at four dam sites offering the best opportunities for storage. The contour map shows the lands which would be flooded by the erection of a dam of any feasible height, and tables showing the flooded areas and capacities of the reservoirs were also prepared. A report of this survey is given under the heading of Moosejaw Creek Drainage Basin.

The water supply in the vicinity of Regina, Moosejaw, and along the Soo Line of the Canadian Pacific Railway is limited and it is very important that we should continue a study of the regimen of flow of Moosejaw Creek for several years. This district will be extended during the coming year to include Souris, Qu'Appelle, and South Saskatchewan Rivers. Souris River, which heads in Canada, crosses the International boundary into the United States and then re-crosses into Canada and finally empties into Assiniboine River east of Brandon. This river traverses a large territory in Canada and is the only stream in that district. It is proposed to divert it for irrigation purposes, in North Dakota, which may affect Canadian interests.

OFFICE WORK.

As above intimated the reports of the gauge height observers and the hydrographers were transmitted to the Chief Hydrographer by postal cards.

These were entered on office forms and filed in a suitable cabinet where they can be referred to at any time without any trouble. As the engineers completed their computations, the results were entered on convenient forms and filed in the same cabinet.

The accounts of the survey were kept in a combined day book and journal, approved by the Accountant of the Department. Statements of expenditures were prepared and sent to the Superintendent of Forestry and Irrigation at the end of each month.

Miss G. E. Corrigan acted as clerk in the office during 1910. Besides typing and filing the correspondence, she entered and filed the cards, posted the day-book and ledger and prepared the monthly statements.

When it was decided to continue two engineers in the field during the winter, it was found that the remaining staff of engineers could not complete the maps, curves and office computations before spring. Mr. Joseph Cawthorn was therefore engaged as draftsman. Since joining the staff, he has prepared the maps, and assisted in plotting curves, checking computations, and copying the records for the Annual Report of the Survey.

There has been a slight tendency in the past to make a very big showing in the field work and to overlook the importance of the office work. Sufficient staff should be provided to thoroughly check all the reports and field books as they are received. I, therefore, strongly recommend that the office staff be increased to include a computer. The Chief Hydrographer could then keep a much better check on the work of his assistants and when the engineers return to the office their field notes would be ready to be plotted and the data for the report could be compiled in much better shape and at an earlier date.

FUTURE WORK.

A number of applications have been received for water rights on streams in the vicinity of Wood Mountain and the lower part of Frenchman River. Very little information is available regarding the water supply or the possibility of irrigation in this district. There do not appear to be any permanent or large streams in the district but there are indications of considerable run-off at certain seasons of the year, and of possibilities of storing water for irrigation purposes. An engineer will be placed in the field as soon as possible to study and report on the water supply in this district.

During the month of March, Mr. Greene made miscellaneous discharge measurements of the North and South Saskatchewan Rivers, and arrangements are being made now to establish regular stations on these streams as soon as possible. These are large and important streams, for they carry almost all the run-off of Southern Alberta and Saskatchewan. Records on them will be very useful, locally, for power studies, and generally for statistical purposes, to show the conditions existing over large areas. They may also be used as primary stations, and their records in connection with short series of measurements will serve as bases for estimating the flow at other points in the drainage basin.

The records of the survey are being used quite extensively now by engineers and I think the time is near at hand when the field of operations should be extended to include other parts of the Dominion. I would like to make miscellaneous gaugings of some of the streams in Eastern Manitoba, such as Winnipeg, Whitemouth, and Red Rivers. The United States Geological Survey have established a gauging station on Rainy River at International Falls and have records covering the period from March 1st, 1907, to the present. This is an international stream and important for power purposes, and I would suggest that the Department consider the advisability of taking records of the flow of this stream. I would also suggest that we might do some work in the Railway Belt of British Columbia.

In all investigations of water resources the most important factor is the available supply. It is also the factor that requires the longest time to determine satisfactorily, owing to the great fluctuations in stream flow from year to year. The stream gaugings already under-

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taken should, therefore, be continued for a number of years in order that the records may be long enough to show extremes of flow as well as a reliable mean.

The low flow of 1910 has demonstrated the part that municipal water supply and sewage disposal have in the use of rivers and therefore data should be compiled to show the amount of such water supply and sewage and the source of the former (where in surface waters) and the disposal of the latter.

I do not think it necessary to elaborate on the importance of continuing observations during the winter on the more important streams. The minimum flow occurs during that season and should be determined for use in considering power schemes.

Next in importance to a knowledge of the available water supply is a knowledge of the fall of the streams, and the possibilities of storage. This is necessary to determine the value of the river for irrigation, water power, as an outlet for drainage ditches, and as an available channel for flood prevention work. River profile and Reservoir site surveys should therefore be commenced as soon as possible on the more important streams of the West.

DEFINITIONS.

The volume of water flowing in a stream is known as run-off or discharge. In expressing it various units are used, depending upon the kind of work for which the data are needed. Those used in this report are "Second-feet," "acre-feet," "run-off per square mile" and "run-off in depth in inches" and may be defined as follows:

"Second-foot," is an abbreviation for cubic foot per second and is the body of water flowing in a stream one foot wide and one foot deep at the rate of one foot per second.

The "acre-foot" is the unit capacity used in connection with storage for irrigation work, and is equivalent to 43,560 cubic feet. It is the quantity required to cover an acre to a depth of one foot.

The expression "second-feet per square mile" means the average number of cubic feet of water flowing each second from every square mile of drainage area on the assumption that the run-off is uniformly distributed.

"Depth in inches" means the depth of water in inches that would have covered the drainage area, uniformly distributed, if all the water could have accumulated on the surface. This quantity is used for comparing run-off with rain-fall, which quantity is usually given in depth in inches.

It should be noticed that "acre-feet and depth in inches" represent the actual quantities of water which are produced during the periods in question while "second-feet" on the contrary, is merely a rate of flow per second.

EXPLANATION AND USE OF TABLES.

The data obtained and the estimates made therefrom have been compiled in tabulated form and for each regular gauging station are given, as far as available, the following data:—

1. Description of station.
2. List of discharge measurements.
3. Daily gauge height and discharge table.
4. Table of monthly discharges and run-off.

The description of stations gives such general information about the locality and equipment as would enable the reader to find and use the station. It also gives, as far as possible, a complete history of all the changes that have occurred since the station was established and that might affect the records in any way.

The list of discharge measurements gives the results of all the discharge measurements that have been made at or in the vicinity of the gauging station or have been used in completing the records for the gauging station. It gives the date on which the measurement was made, the name of the hydrographer, the width and area of cross-section, the gauge height and the discharge in second feet.

The table of daily gauge heights and discharges given in this report is a combination of two tables kept in the office of the survey, namely the table of daily gauge heights and the station rating table. The table of daily gauge heights gives the daily fluctuations of the surface of the water above the zero of the gauge, as reported by the observer. During high water, two observations of the gauge were made at some stations and the gauge height given in the table is the mean of the observations for the day. The discharge measurements and gauge heights are the base data from which the other tables are computed. The table of the daily discharges is the discharge in second-feet, corresponding to the stage of the stream, as given by the station rating table.

In the table of monthly discharge the column headed "Maximum" gives the mean flow for the day when the mean gauge height was highest. As the gauge height is the mean for the day, there might have been short periods when the water and the corresponding discharge were greater than given in this column. Likewise, in the column "Minimum" the quantity given is the mean flow for the day when the mean gauge height was lowest. The column headed "Mean" is the average flow for each second during the month. The computations for the quantities in the remaining columns have been based upon this mean. The drainage area for each

gauging station was marked off on the sectional maps of the Department and the area taken off with a planimeter. In many districts, information regarding topographical features is very incomplete and the computed areas are only approximate. As the surveys of the Department are extended and completed these computations will be checked and, if necessary, corrected.

CONVENIENT EQUIVALENTS.

The following is a list of convenient equivalents for use in hydraulic computations:—

- 1 second-foot equals 35.7 British Columbia miner's inches, or one British Columbia miner's inch equals 1.68 cubic feet per minute.
- 1 second-foot equals 6.23 British imperial gallons per second; equals 538,272 gallons for one day.
- 1 second-foot equals 7.48 United States gallons per second; equals 646,272 gallons for one day.
- 1 second-foot for one year covers 1 square mile 1.131 feet or 13.572 inches deep.
- 1 second-foot for one year equals 31,536,000 cubic feet; equals 724 acre-feet.
- 1 second-foot equals about 1 acre-inch per hour.
- 1 second-foot for one 28-day month covers 1 square mile 1.041 inches deep.
- 1 second-foot for one 29-day month covers 1 square mile 1.079 inches deep.
- 1 second-foot for one 30-day month covers 1 square mile 1.116 inches deep.
- 1 second-foot for one 31-day month covers 1 square mile 1.153 inches deep.
- 1 second-foot for one day equals 1.983 acre-feet.
- 1 second-foot for one 28-day month equals 55.54 acre-feet.
- 1 second-foot for one 29-day month equals 57.52 acre-feet.
- 1 second-foot for one 30-day month equals 59.50 acre-feet.
- 1 second-foot for one 31-day month equals 61.49 acre-feet.
- 100 British Imperial gallons per min. equals 0.268 second-foot.
- 100 United States gallons per min. equals 0.223 second-foot.
- 1,000,000 British Imperial gallons per day equals 1.86 second-feet.
- 1,000,000 United States gallons per day equals 1.55 second-feet.
- 1,000,000 British Imperial gallons equals 3.68 acre-feet.
- 1,000,000 United States gallons equals 3.07 acre-feet.
- 1,000,000 cubic feet equals 22.95 acre-feet.
- 1 acre-foot equals 43,560 cubic feet.
- 1 acre-foot equals 271,472 British Imperial gallons.
- 1 acre-foot equals 325,850 United States gallons.
- 1 inch deep on 1 square mile equals 2,323,200 cubic feet.
- 1 inch deep on 1 square mile equals 0.0737 second-foot per year.
- 1 acre equals 43,560 square feet.
- 1 cubic foot equals 6.23 British Imperial gallons.
- 1 cubic foot equals 7.48 United States gallons.
- 1 cubic foot of water weighs 62.5 pounds.
- 1 foot per second equals 0.682 miles per hour.
- 1 horse power equals 550 foot pounds per second.
- 1 horse power equals 746 watts.
- 1 horse power equals 1 second-foot falling 8.80 feet.

To calculate water power quickly:
$$\frac{\text{Sec.-ft.} \times \text{fall in feet}}{11} = \text{net horse power on water wheel, realizing 80 per cent of theoretical power.}$$

METHODS OF MEASURING STREAM FLOW.

There are three distinct methods of determining the surface flow of streams: (1) By measurements of slope and cross-section and the use of Chezy's and Kutter's formulae; (2) by means of weirs, which include any device or structure that by measuring the depth on a crest or sill of known length and form, the flow of water may be determined; (3) by measuring the velocity of the current and the cross-section. The third method is the one most commonly used by this survey. The second is used when the flow is too small to be accurately determined by the third, while the first is only used in making estimates of the discharge of a stream when the only data available are the cross-section and slope.

SLOPE METHOD OF DETERMINING DISCHARGE.—The slope of a stream, or rather of a section of a stream, is the difference in elevation between the upper and lower ends of the section, commonly called the fall, divided by the distance or the length of the section. Slope sections vary in length from two or three hundred feet to several hundred feet, depending largely upon the nature of the stream.

It is difficult to ascertain accurately the slope of the water surface in a stream, since in nearly all streams there are pulsations in the water, causing the surface to rise and fall locally. In most streams the slope of the bottom is far from uniform, and the flow of water in any given section is more or less influenced by the flow in the adjacent section, above or below. For this

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reason it is a good plan to consider a number of adjacent sections, comprising a considerable length of the stream in one computation, being careful to take into account the diversity of cross-section at various places in the length.

In determining the slope of the surface of a stream, levels are taken of the water surface at each end of the slope section, and referred to some datum or bench mark. A good plan is to set firmly a stout wooden stake below the water surface at each end of the slope section, and then to drive a nail into the top of each stake, so that the nail-head will exactly coincide with the water surface. The difference in elevation between the two nail-heads, divided by the distance between the stakes, will give the slope.

The wetted perimeter is that portion of a stream channel that is in contact with the water. The form or outline of the wetted perimeter of a stream has an important influence upon the velocity of the current. It is usually determined graphically from the plotted cross-section or may be measured by means of a flexible tape or chain after the flood has subsided.

The hydraulic radius, which is sometimes called the mean radius of the channel below the water surface is found by dividing the area of the cross-section (in sq. ft.) by the length of the wetted perimeter (in feet).

The Chezy formula, which is the fundamental formula for stream discharge, is:

$$Q = A V$$

in which Q = the discharge of the stream in sec. ft.

A = the area of the cross-section in sq. ft.

V = the mean velocity of flow, in ft. per sec.

In applying this formula to the determination of stream discharge, the mean velocity of a stream is considered a function of the slope and of the wetted perimeter of the stream. This may be expressed by formula as follows:

$$V = C \sqrt{rs}$$

in which r = the hydraulic radius of the channel.

s = the surface slope.

and C is a variable coefficient, depending upon the nature of the channel.

In determining the value of C for any given case it is customary to make use of Kutter's formula, which is:—

$$C = \frac{41.6 + \frac{.00281}{s} + \frac{1.811}{n}}{1 + \left\{ 41.6 + \frac{.00281}{s} \right\} \frac{n}{\sqrt{r}}}$$

In this formula r and s have the same significance as in the Chezy formula and the new factor n is called the coefficient of roughness. It is a variable coefficient, and its value is dependent upon the size, shape, slope and degree of roughness of the channel. Tables of values of n are given in various text books, but it is difficult to choose the correct value. It is therefore advisable whenever possible to compute the value of n from a measured discharge. As the slope method of determining discharge is seldom employed except to estimate flood discharge, a current meter measurement is very often made at the slope section, during low water. Having determined the mean velocity, slope and hydraulic radius at the time of the metering, the value of C may be

found from the formula $V = C \sqrt{rs}$ or $C = \frac{V}{\sqrt{rs}}$ Trautwine's Pocket Book for Civil Engineers

and other texts contain tables giving the value of n for different values of r , s , and c . From these tables we can interpolate the proper value of n for a particular section of the stream, at low water stage. In most cases this value of n is applicable to high water and flood conditions of the stream also and is used with values of r and s for the high water or flood cross-section to determine the value of C at the higher stage. Having determined the value of C the computation of the discharge is simple.

The results obtained by the slope method are in general only roughly approximate, owing to the difficulty in obtaining accurate data and the uncertainty of the value of n to be used.

WEIR METHOD OF DETERMINING DISCHARGE.—As yet no permanent weirs have been constructed by this survey, and the only regular weir measurements have been on small streams by means of a temporary weir. The weir used consists of a wooden base of 2-inch plank, to which is bolted a rectangular notch of three-eighths inch steel with bevelled edges. (See photo.)

In making a measurement by means of a temporary weir, the following directions should be followed as far as possible. The weir should be placed perpendicular and at right angles to the bed of the stream with the crest level. The discharge should be free in so much as the nappe should have sufficient fall to allow air to have free circulation underneath it, and the head or depth on the crest should not exceed one-third of the length. The channel of approach should be several times as wide as the opening and the depth of water in the bay or pond should be at least twice the head on the weir, so as to eliminate velocity of approach and cross-currents. In choosing a site for a weir, a point should be chosen that will fulfil the above conditions and give a good sized bay or pond.

To set up a temporary weir, a dam of sods and earth are thrown across the stream, the weir set in place and the sods tramped firmly around it to stop all leakage. On a stream with a sandy

bed sods or clay must be placed on the bottom for a few feet upstream to form a mattress to prevent the undermining of the dam.

After the bay has filled up the head of the water is observed by taking the difference in elevation of the crest of the weir and the elevation of the water surface in the bay at a distance of 4 to 10 feet from the weir, with an engineer's level. Two common methods of getting the elevation of the water surface are (1) hold the levelling rod on a stone or other solid body under water and subtract the depth of water on the rod from the sight on the rod; (2) drive a pin divided into tenths of feet into the bed of the stream so that an even tenth is level with the surface of the water, then hold the levelling rod on the top of the pin and add the length of pin above the water to the sight on the rod.

When the head of water has been determined, the discharge is computed by using one of the standard formulae which will suit the case. Tables giving the discharges for different heads and lengths of crests are published in many engineering texts.

The formula used by this survey for rectangular sharp-crested weirs is:

$$Q = 3.33 (L - .2H) H^{3/2}$$

being a modification of Francis' formula, to allow for end contractions and elimination of velocity of approach.

in which Q = discharge in sec. ft.; L = length of crest in feet; H = head in feet.

Measurements by means of temporary weirs should be made some distance above or below the gauge. If they are made close to a gauge, the gauge must be read before the weir is placed in the stream and the pond must be allowed to run off after the weir is removed before the gauge is re-read.

VELOCITY METHOD OF DETERMINING DISCHARGE.—There are two methods of determining the velocity of flow of a stream, namely, direct and indirect. In the direct method by which the velocity is determined by means of floats, the liability of error is large, and the results far from satisfactory. This method is seldom used except for very rough estimates or when a current meter cannot be used. There are three common kinds of floats, viz: surface, sub-surface and tube or rod floats. In each the procedure is the same. A straight piece of channel is selected for the run and two cross-sections taken at some convenient distance apart, usually from 100 to 200 feet. They are then divided into strips by means of a tagged wire. The velocity in each strip is then measured by noting the time taken by the float in traversing the run or distance between the two cross-sections. As the time and distance are both known the velocity can easily be computed. The velocity, whether measured by surface, sub-surface or tube floats, must be multiplied by a coefficient less than unity to reduce the mean velocity before being used to compute the discharge.

The indirect or current meter method is the most reliable and most widely used method of determining the velocity of the flow of a stream. The meter used by this survey is the Price Patent, manufactured by W. & L. E. Gurley, Troy, N.Y. It consists of six cups attached to a vertical shaft which revolves on a conical hardened steel point when immersed in moving water. The number of revolutions is indicated electrically. The rating or relation between the velocity of the moving water and the revolutions of the wheel is determined for each meter by drawing it through still water for a given distance at different speeds and noting the number of revolutions for each run. From this data a rating table is prepared which gives the velocity per second of moving water for any number of revolutions in a given time interval.

The accuracy of a discharge measurement taken at a velocity-area station is dependent on two factors, the accuracy with which the area of the cross-section and the mean velocity of the flow normal to that section are measured. There is no special difficulty in measuring the first factor, but the second, the velocity, is very difficult to measure accurately, because it is constantly changing. It varies not only from the surface to the bottom but from one bank of the stream to the other, making it necessary to measure it at a number of points.

In making a measurement with a current meter, a number of points, called measuring points, are measured off above and in the plane of the measuring section, at which observations of depth and velocity are taken. These points are spaced equally for those parts of the section where the flow is uniform and smooth, but should be spaced unequally for other parts according to the discretion and judgment of the engineer. In general, the points should not be spaced farther apart than 5 per cent. of the distance between piers, nor farther apart than the approximate mean depth of the section at the time of measurement.

The measuring points divide the total cross-section into elementary strips at each end of which observations of depth and velocity are made. The discharge of any elementary strip is the product of the average of the depths at the ends, the width of the strip, and the average of the mean velocities at the two ends of the strip. The sum of the discharges of the elementary strips is the total discharge of the stream.

METHODS OF DETERMINING MEAN VELOCITY.

There are a number of different methods of determining the mean velocity at the ends of these strips, or, as it is commonly called, the mean velocity in a vertical, namely, multiple-point, single-point, and integration. These three principal multiple-point methods in general use are the vertical velocity-curve, three point, and two point method.

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VERTICAL VELOCITY CURVE METHOD OF DETERMINING MEAN VELOCITY.—In this method the centre of the meter is held as close to the surface of the water as is possible, being careful to keep it out of reach of all surface disturbances, and then at a number of different depths throughout the vertical. The velocity at each position of the meter is recorded. These observations are then plotted with velocities in feet per second as abscissae and their corresponding depths in feet as ordinates and a mean curve is drawn through the points. The mean velocity for the vertical is obtained by dividing the area bounded by the curve and its axis by the depth. In the absence of a planimeter for measuring the area, the depth is divided into 5 to 10 equal parts, and the velocities of the centre ordinates of these parts are noted. The mean of these velocities will very closely approximate the mean in the vertical.

It is often more convenient, when the depth is a number of feet and a fraction, as 7.4, to divide the depth into 7 parts of a foot width, and a part of 0.4 foot width. Then the velocity to enter for the narrow part is 0.4 of the velocity at the centre of it.

The vertical velocity curve is useful in studying the manner in which velocities occur in a vertical. From a study of a number of these curves the other shorter methods of determining mean velocity are deduced. This method is not used in general routine measurements, except during the winter, on account of the length of time taken to complete a measurement, for a change of stage is almost sure to occur during a measurement on a large stream which counter balances the increased accuracy. For this reason its use is limited to the determination of the coefficient to be used in the reduction of values obtained by other methods of measuring velocity to the true value, to the measurement of velocities under new and unusual conditions of flow, and for measurements under ice.

THREE-POINT METHOD OF DETERMINING MEAN VELOCITY.—This method gives the greatest accuracy outside of the vertical velocity curve and is the method most commonly used by this survey during the open season. The meter is held at 0.2, 0.6 and 0.8 depth. The mean velocity is then obtained by dividing by 4 the sum of the velocities at 0.2 and 0.8 depth plus twice the velocity at 0.6 depth. It is the best method to use during low water or in wide shallow streams having a rough bed where the thread of mean velocity varies considerably from the 0.6 depth.

TWO-POINT METHOD OF DETERMINING MEAN VELOCITY.—In studying the vertical curves made at a number of different points and under varied conditions it has been found that the mean of the velocities occurring at 0.2 and 0.8 depth gives very nearly the mean velocity in the vertical. Use is made of this fact in the two-point method of determining mean velocity, the meter being held at 0.2 and 0.8 depth in the vertical. This method has been found more accurate than the single point method and the time required for a metering is not very much greater. This method has been found to give, also, a very close approximate to the mean velocity in measurements of ice-covered streams, although these flow under very different conditions from those of open water.

SINGLE-POINT METHOD OF DETERMINING MEAN VELOCITY.—Experiments made under most favourable conditions and extending over a long period have established the point of mean velocity in a vertical at 0.6 of the depth. Therefore the error resulting from the use of the 0.6 depth as the depth of mean velocity is very small though in some few cases a study of the vertical velocity curve will show the need of a coefficient to reduce the observed velocities to the mean. The variation of the coefficient from unity in individual cases is, however, greater than the two or three point method and the general results are not as satisfactory. For that reason this method is not employed very extensively by the survey.

In the other principal single-point method the meter is held near the surface, at from 0.5 to 1 foot below the surface; care being taken to sink the instrument below the influence of wind or waves. The resulting velocities must be multiplied by a coefficient to reduce them to mean velocities. This coefficient as found by a large number of experiments, varies from 0.78 to 0.98, depending upon the depth and speed of the stream. The deeper the stream and the greater the velocity the larger the coefficient. In flood work coefficients varying from 0.90 to 0.95 should be used. This method is only used when the current is too strong to permit the sinking of the meter to any great depth below the surface of the water. It is often employed at times of flood, or when a stream is carrying a lot of drift wood or ice.

INTEGRATION METHOD OF DETERMINING MEAN VELOCITY.—This method of determining the mean velocity in a vertical consists in moving the meter at a slow uniform speed from the bed of the stream to the surface and return in a vertical direction, the time and revolutions being observed. In travelling through all parts of the vertical the meter is acted upon by each and every thread of velocity from the bed to the surface of the stream, and the resulting observations determine the mean in that vertical.

This method is very useful in checking the results of other methods. It is, however, seldom used by this survey as the Price meter is not suited to observations by this method, since the vertical motion of the meter causes the wheel to revolve.

GAUGING STATIONS.

The first step is to select a suitable locality for a gauging station. Although apparently simple, this is really a difficult task. Not only must the water be moving in nearly straight lines over a solid bed and between well defined banks, but the place must be

accessible at moderate cost and there must be living near a competent person who can be engaged to serve as observer. Permanent gauging stations should only be selected after a very thorough reconnaissance. In the irrigation districts and in more thickly populated districts there is more or less diversion of water. This is apt to complicate matters for the hydrographer, or a gauging station above all works may not include all the tributaries of the stream and it is often necessary to establish gauging stations at several points along the streams, and on tributaries, canals and pipe lines, in order to obtain complete information regarding the water supply in a particular stream.

There are three classes of gauging stations, namely, wading, bridge and cable stations. The wading station can of course only be used in the case of small streams having a maximum depth at its highest stage of 3 feet or less. The equipment for a wading station is small, consisting usually of a plain staff gauge, graduated to feet and hundredths, and fixed vertically to one of the banks of the stream. For convenience a measuring line, usually a wire with tags, may be fixed permanently at this section. When taking the reading, the hydrographer should stand below and to one side of the meter so as to not cause eddies in the water.

Bridge stations because of their permanency and the freedom of movement allowed the hydrographer, are much preferred. Very often, however, more particularly in swift currents, the piers materially affect the accuracy of the results. When the gauge cannot be attached to a pier, it is often attached horizontally to the guard-rail or floor of the bridge and the height of the stream is found by lowering a weight by a chain over a pulley. It is indicated by a marker on the chain. Distances of three, five or ten feet according to the size of the stream are marked on the lower chord of the down stream side of the bridge, to serve as a measuring line.

Frequently it is impossible to establish a permanent gauging station at a bridge. In that case the wire cable of a ferry can be utilized, or, if that is not available, a permanent wire cable is stretched across the river. For spans of average length a galvanized wire cable three-fourths of an inch in diameter is safe. It is supported at each bank by means of high struts or by passing it through the crotch of a tree. The cable is run into the ground and anchored securely to a "dead man" buried at least six feet below the surface, or if convenient it is anchored to the lower part of the trunk of a tree. A turnbuckle is inserted in the cable between the strut and anchorage to permit tightening the cable when it begins to sag. A permanent measuring line, usually a wire, with tags 5 or 10 feet apart, is stretched across the stream just above the cable. A cage large enough to carry two men and instruments is constructed and suspended from the cable by means of cast iron pulleys. The cage is moved from point to point by hand. A stay line, usually quarter-inch guy wire, is stretched across the stream about thirty to forty feet upstream from the cable, and securely fastened. By passing a sash cord through a pulley hung on this stay line the current meter is prevented from being carried down stream.

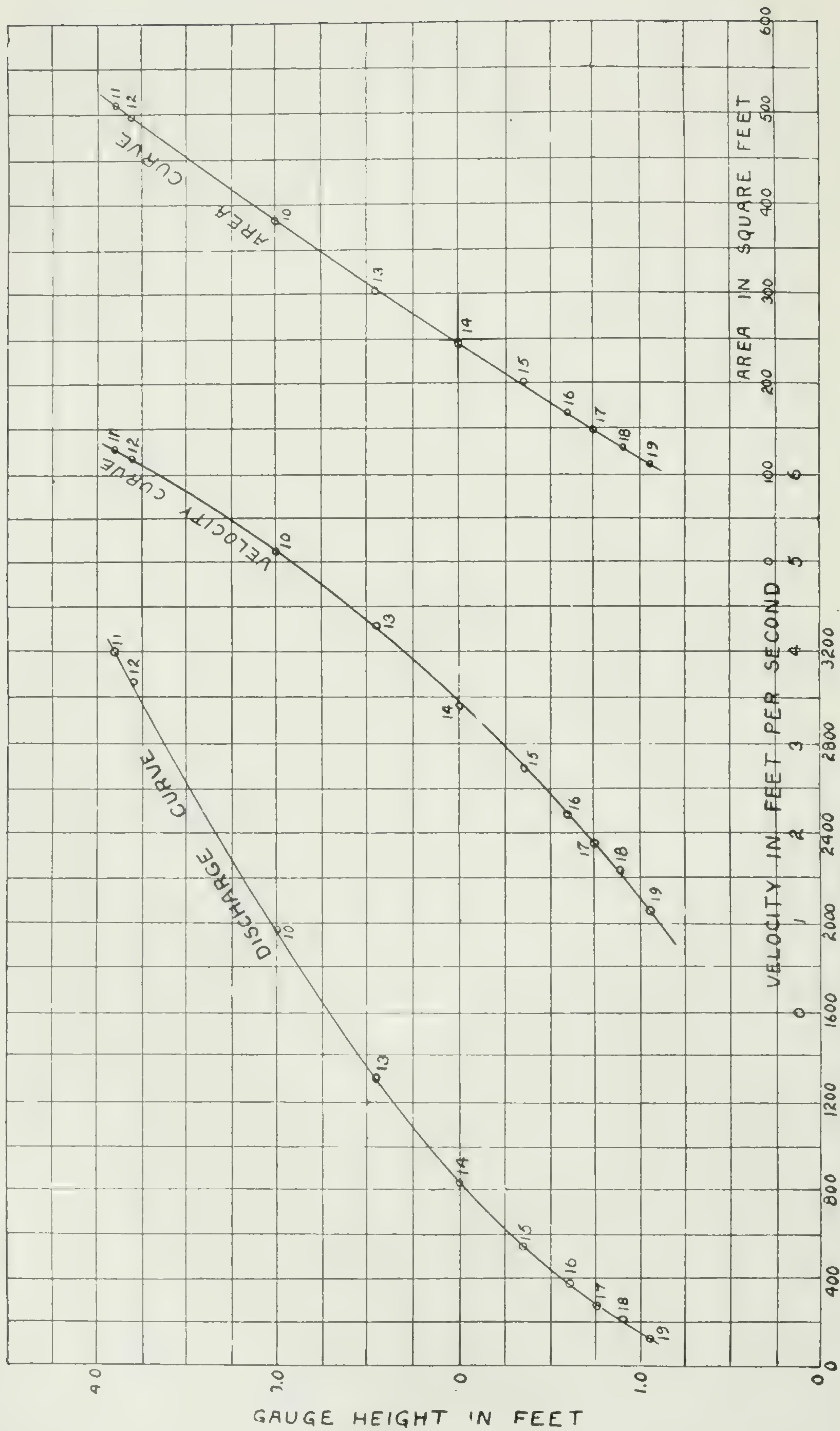
LOW VELOCITY LIMITATIONS.

Owing to the presence of a slight amount of friction in the current meter, a certain definite velocity is required to make the wheel revolve, *i.e.*, to overcome the frictional resistance of the wheel. For this reason the meter is unsuitable for the measurement of low velocities, approaching this value. This velocity, which is required to overcome friction, and which is obtained from the meter rating curve, is called the velocity of no flow for the particular meter referred to. It varies in different types of meters, and also slightly in meters of the same type, according to the time the meter is in use, but very seldom exceeds 0.2 foot per second in any meter. From a number of observations the low velocity limit, below which values of velocity are unreliable, is found to be 0.5 foot per second. In many cases at low stages the gauging station on a stream becomes unsuitable for a discharge measurement owing to the mean velocity in the section falling below the safe limit. In such instances where it is possible to wade the stream a suitable gauging section may be located within a reasonable distance of the regular station and the discharge measurements made at this point. When a gauging is made at a cross-section other than the regular station, sufficient soundings should be made at the latter at the time of the gauging to develop the cross-section and compute the area. The measurement is thus referred to the regular gauging station and the mean velocity and area at the regular section is reported and used in the office computations.

WINTER MEASUREMENTS.

Previous to the season of 1910-11, no records were taken of the winter flow. During the past winter daily gauge height records were collected for a number of the more important streams in the Calgary and Macleod districts. Discharge measurements were made at these stations at intervals of from two to three weeks.

The laws governing the flow of stream in open channels have, through extensive investigations, become well defined, but the flow under an ice cover has been but little investigated. In winter as in summer the daily discharge of a stream is computed from frequent discharge measurements and daily gauge height observations. In most cases, however, the vertical velocity curve method is used for the determination of the mean velocity in the vertical, as the mean velocity varies considerably. In fact, there are usually two points in the vertical at which the thread of mean velocity occurs under an ice cover. These points are near 0.2 and 0.8 depths and two-point method will give fairly accurate results, but in this report all discharges are based on computations from vertical velocity curves.



DISCHARGE, AREA, AND MEAN-VELOCITY CURVES OF BELLY RIVER AT STAND OFF, ALTA., FOR 1909.

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The discharge measurements are made through holes in the ice from 5 to 10 feet apart, and large enough to allow the meter to pass through freely. The measurement is then taken in the same manner as at open sections, except that the depth of the stream is taken as the distance from the bottom of the ice to the bed of the stream. The soundings, however are always referred to the surface of the water in the holes, the distance from the surface of the water to the bottom of the ice being measured and subtracted from the sounding to obtain the depth. The meter should be kept in the water continuously to prevent the wheel from freezing and sticking.

The gauge is read once a day, the observer noting the elevation of the water as it rises in a hole cut through the ice, the height of the top of the ice, the thickness of the ice, presence of needle or slush ice, snow on top of ice, ice jams, and also any sudden changes in temperature. To do this observers are provided with an ice chisel for chopping holes, and a square to measure the thickness of the ice. Any form of gauge may be used but the chain gauge is the most satisfactory, as the staff gauge being frozen to the ice, heaves with it.

Some of the cross-sections used in the summer were found to be unsuitable for winter measurements. This was usually caused by the cross-section filling up with slush, needle or anchor ice. There is a flow through this ice and it is impossible to measure it. The most suitable stations for winter measurements are those where there is a long stretch of very smooth sluggish water above the station and a rapid fall below.

RE-RATING OF CURRENT METERS.

Each meter is rated before being used, in order to determine the relation between the revolutions of the wheel and the velocity of the water. The meter is driven at a uniform rate of speed through still water for a given distance, and the number of revolutions of the wheel and the time are recorded. From this data the number of revolutions per second and the corresponding velocity per second are computed. Tests are made for speeds varying from the slowest which will cause the wheel to revolve to several feet per second. The results of these runs, when plotted with revolutions per second as abscissae and velocity in feet per second as ordinates, locate points that define the meter rating-curve, which for all meters is practically a straight line. From this curve a meter rating table is prepared. Theoretically, the rating for all meters of the same make and type should be the same, but as a result of slight variations in construction, and in bearing of the wheel on the axis at different velocities, the ratings differ. After a meter has been in use for some time the cups may have received small injuries, or the bearing of the wheel on the axis may have changed owing to unavoidable rough usage. These changes will affect the running of the meter and change its rating. As a consequence each meter is re-rated at regular intervals and a new rating curve and table prepared. During 1910 several meters were re-rated by F. H. Peters by means of a gasoline launch on Chestermere Lake, and with only one exception the meters varied but little from the original rating.

The boat method of rating meters is, however, very crude, and Mr. Peters has designed an up-to-date rating station consisting of a concrete lined tank, 250 feet long, 6 feet wide, and 5½ feet deep, and a car operated by a motor. This will be constructed at once and all the meters will be carefully re-rated at regular intervals.

OFFICE COMPUTATIONS.

RATING CURVES AND TABLES.—When a series of discharge measurements has been made at a gauging station a rating curve is constructed for that station, showing graphically the discharge corresponding to any stage of the stream within the limits covered by the gaugings. This curve, as it is usually drawn, has as abscissae, the discharges in second-feet and as ordinates, the corresponding gauge heights at which the discharges were made. A smooth curve is drawn through the resulting set of points and from this curve the discharges at any stage within the limits of the curve are taken. Some measurements may be more reliable than others, owing to more or less favourable conditions at different times of gauging, or to other causes. In order to obtain the weight of the different measurements, curves with area and mean velocity, as abscissae, and gauge heights as ordinates, are also drawn. From a study of these curves any discrepancies in a measurement, either in its area or mean velocity, may be detected. Should it be necessary to extend the rating curve beyond the limits of actual discharge measurements the area and mean velocity curves may be constructed to the stages for which the discharge curve is desired and the latter found by taking the product of the two curves. The discharge curve under natural conditions of flow is always convex to the gauge height axis. The area curve is either a straight line or is convex to the gauge height axis, except in the case of overhanging banks when it becomes concave to the axis. The mean velocity curve is always concave to the gauge height axis, except in cases where standing water occurs below the stage of no-flow. In this case the curve will assume a reverse form, starting from the gauge height of zero flow with a curve convex to the gauge height axis and gradually reversing to a curve concave to this axis. In plotting all three curves the horizontal and vertical scales should be so chosen that the curves may be used within the limits of accuracy for the work, and in their critical position will make, as nearly as possible, angles of 45 degrees with each axis.

The rating curve being constructed it becomes necessary to prepare a station rating table, giving the discharge at any stage of the stream within the limits of the daily gauge height observa-

tions on record. From this rating table the daily discharges corresponding to the daily gauge heights are read and tabulated. The rating table is constructed for tenths, half-tenths, or hundredths of feet, according to the readings of the gauge to which it is to be applied. The discharges for this table are read directly from the rating curve and are then adjusted so that the differences for successive stages shall be either constant or gradually increasing, but never decreasing, unless the station is affected by backwater.

DAILY DISCHARGE, MONTHLY MEAN, AND RUN-OFF.—The rating table being made to cover the range of daily gauge height observations, the next procedure in the computations is to make out a table of daily discharges from this rating table. The daily gauge heights are copied as they were sent in by the observer and opposite each the corresponding discharge is filled in from the rating table. The monthly discharge is found by totalling the daily discharges for the month in question and the monthly mean is obtained by dividing this total by the number of days in the month.

The run-off is computed with two different sets of units, depending upon the kind of work for which the data is intended, as follows: (1) Run-off in inches is the depth to which a plane surface equal in extent to the drainage area would be covered if all the water flowing from it in a given time were conserved and uniformly distributed thereon; it is used for comparing run-off with rain-fall, which is usually expressed in depth in inches. The mean run-off in second-feet per square mile for each month is used. The monthly mean run-off in second-feet is divided by the area of the drainage basin in square miles to find the monthly mean run-off per square mile. This result, reduced to run-off in depth in inches for the monthly period, is in the form required.

(2) The run-off in acre-feet is the form of most use in connection with storage. An acre-foot is equivalent to 43,560 cubic feet, and is the quantity of water required to cover an acre to the depth of one foot. The monthly mean run-off in second-feet is used for the computation of run-off in acre-feet. The monthly mean is reduced to cubic feet per month and this quantity divided by 43,560 gives the run-off in acre-feet.

The run-off of the stream being computed both in depth, in inches and in acre-feet for each month, the run-off for the period, during which observations of run-off were made, is found by the summation of the amounts of run-off for the several months making up this period.

CHANGING CONDITIONS OF CHANNEL.—On streams such as Milk River, whose bed is in a constant state of motion, measurements of discharge should be made every few days, otherwise considerable data relating to changes cannot be obtained. For discharges on days other than those on which measurements are taken, the interpolation method is used. The two methods of interpolation in general use are the Stout and Bolster Methods.

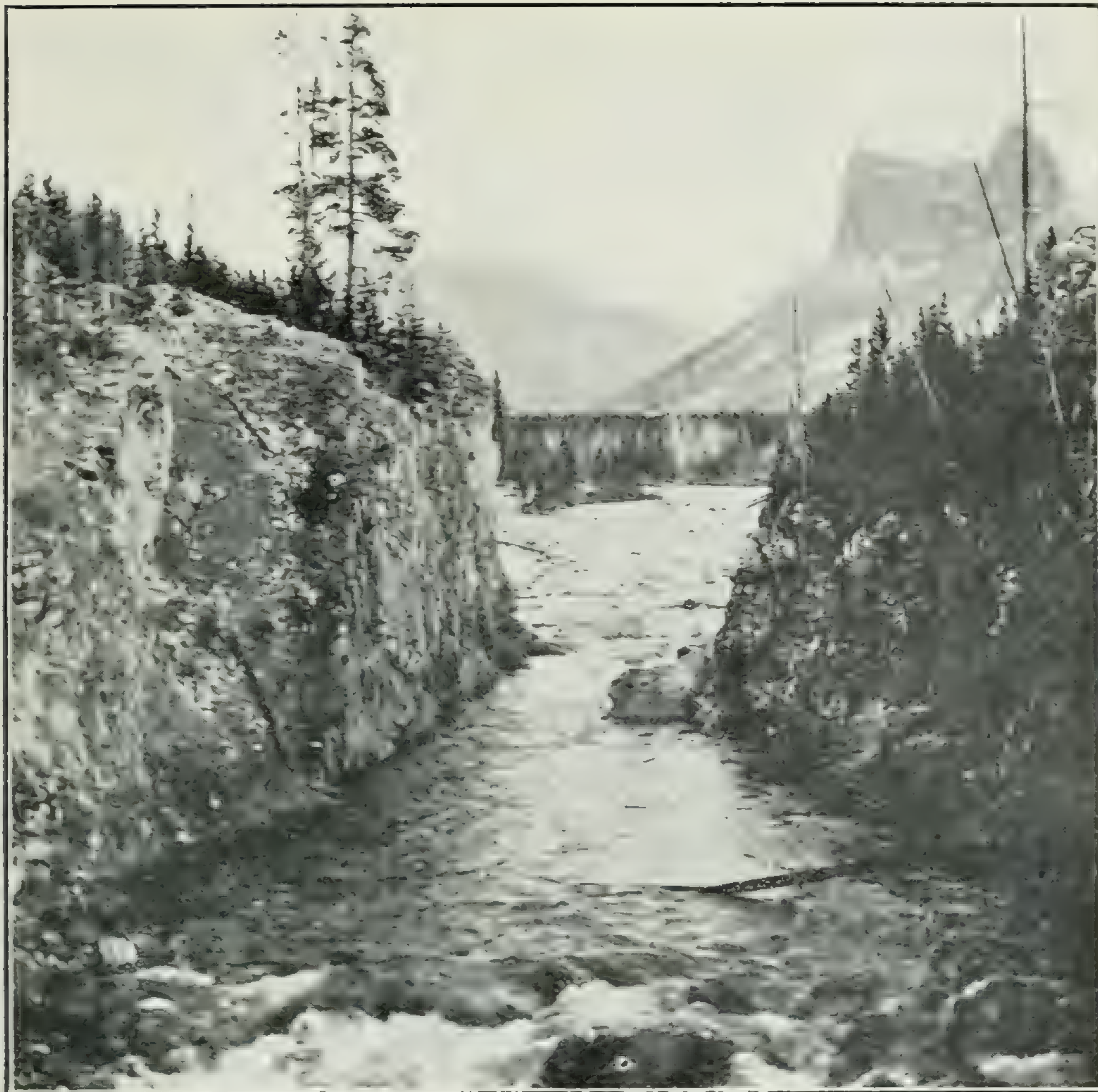
The Stout method deals with the correction of the gauge heights. A curve is drawn, using the difference between the actual gauge heights at the time of measurement and the gauge height corresponding to the measured discharge as ordinates and the corresponding days of the month as abscissae. From an irregular curve drawn through these points corrections for gauge heights can be made for days on which there was no discharge measurement. When the discharge is greater than that given by the curve the correction is positive and vice-versa. Each daily gauge height is corrected by the amount shown on the correction curve, and the corresponding discharge taken from an approximate rating curve for the station.

The Bolster method deals more particularly with the modification of the discharge. Results of discharge measurements covering a whole year or season are plotted, and though considerably scattered, will define one or more regular curves, called standard curves, the number and position of each indicating the radical changes. Where the river bed changes from day to day, the position of the standard curve also varies and must pass through the points indicating the different days. The points indicating two successive measurements are joined by a line, which for short distances on the cross-section paper is a straight line and otherwise a curve. This line is divided into a number of equal parts, each indicating an intervening day, the assumption being that as the change during this period is gradual the daily rating must pass through each point, or day, as represented by the divisions. A simple and convenient way of making these interpolations and moving the daily rating curve is to make a tracing of the standard curve with a vertical line of reference. By keeping the lines of reference coincident this curve can be shifted into any desired position and the discharge read for any gauge height.

ACKNOWLEDGEMENTS.

When the Hydrographic Survey was being organized, and on various occasions since, very valuable assistance was received from members of the staff of the United States Geological Survey, particularly M. O. Leighton, Chief Hydrographer, J. C. Hoyt, Asst., Chief Hydrographer, and Robert Follansbee, District Engineer. The U.S. Geological Survey have been studying the surface flow of water for several years and have thoroughly systematized the work and developed some new and useful methods. We have been fortunate in having the benefit of their experience in organizing our survey. They have issued a large number of very interesting and useful Water-Supply Papers. Copies of many of these have been received and have been freely used.

There are a number of very good text books on Hydraulics, but "River Discharge" by Hoyt and Grover, and "Hydrographic Surveying," by S. H. Lea, deal more fully with stream measurement work than any other texts. These have been used by the survey and are recommended to anyone wishing to make a study of this subject.



Canyon on Cascade River near Bankhead, Alta.



Thirty-Six inch sharp-crested rectangular weir used on small streams.
25d—p. 20.

RED DEER RIVER DRAINAGE BASIN.

General Description.

The Red Deer River rises in the Sawback Range of the Rockies in the Northern portion of the Rocky Mountain Park, near the boundary between the Provinces of Alberta and British Columbia. It flows Eastward for about 40 miles, then North-Eastward for 70 or 80 miles to a point near Red Deer, Alta. From here the river flows in a South-Easterly and Easterly direction to its junction with the South Saskatchewan River just East of the Fourth Meridian in Tp. 22, Rge. 28, W. 3rd Mer. It has a length of approximately 400 miles.

The valley of the Red Deer is wide and deep, the banks being very rough and cut up with a large number of deep coulees, draining into the river. Near its source the basin is well timbered and a good growth of timber is found along its banks for some distance out into the prairie. Seams of coal, well suited for domestic use, are found in the valley and form the principal source of fuel supply for the settlers along the stream in the prairie section.

The river carries a considerable supply of water at all times of the year, but the volume is subject to sudden variations due to the melting of snow in the mountains and heavy summer rains.

Of the tributaries of the Red Deer, the most important are the Panther River, near its head, the Little Red Deer entering in Tp. 36, Rge. 1, W. 5th Mer., and the Rosebud River emptying into it in Tp. 28, Rge. 19, W. 4th Mer. In addition there are innumerable small streams draining into the main river in the Western portion of the basin. From the mouth of the Rosebud River Eastward there is very little drainage into the river.

Irrigation on the Red Deer and its branches is practically unknown. There are only a few small schemes on some of the smaller tributaries. The land along the valley, though lacking moisture, is extremely fertile, and with the help of irrigation much of it might be cultivated and fine crops produced. The irrigation of the bench land from the river would be difficult on account of the small fall in the river, the depth of the valley; and the rolling nature of the lands in the drainage basin.

Very little hydrographic work has been done in this basin, except that a few miscellaneous measurements have been made at different times. A gauging station was established on the Red Deer River near Innisfail, in 1910. It is expected that during the coming year more time will be devoted to the streams in this basin.

RED DEER RIVER NEAR INNISFAIL.

This station was established September 28th, 1910, by H. R. Carscallen. It is located at the traffic bridge on the N.E. quarter Sec. 6, Tp. 36, Rge. 28, W. 4th Mer. The bridge is about four miles North-West of Innisfail. It is a three-span steel structure, supported by timber, rock-filled piers and abutments, with a short approach at the South end of the bridge.

The channel above the station is straight for about 600 yards. An island divides the stream into two channels and extends to within about 300 yards of the station. The channel down stream is straight for about 400 yards. The current is moderate over most of the cross-section, although fairly swift in the right channel. The current is moderate up stream becoming more swift below the station.

The right bank is high and sandy. The left bank is comparatively low and may overflow at very high stages of the stream. Both banks are covered with a dense growth of timber and brush. The bed of the stream is composed of sand and gravel. There is a gravel bar between the two centre piers and at low water there is no flow in this channel. At high water stages the stream is divided into three channels, by the piers of the bridge.

The initial point for soundings is the right face of the left abutment. Discharge measurements are made from the down stream side of the bridge and distances are marked with red paint every five feet along the bottom chord of the bridge.

The gauge is a plain staff, 2" x 4" x 10', graduated to feet and hundredths, spiked to the right abutment on the down stream side of the bridge. It is referred to bench marks as follows: (1) Three spike heads in the cribbing of the right abutment; elevation 14.25. (2) Two spikes in side of large poplar tree on right bank about 50 feet below the bridge; elevation 12.50.

Arrangements were made with Mr. F. F. Malcolm, a building contractor living within 300 yards of the bridge, to take daily gauge height observations of the river. Mr. Malcolm was called away from home almost immediately afterwards, and in consequence no gauge height observations were made. It is expected that regular observations will be made during the coming year. Several discharge measurements at this station were made during the season and a list of these is published below.

DISCHARGE MEASUREMENTS of Red Deer River near Innisfail in 1910.

Date.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Discharge.
		<i>Feet.</i>	<i>Sq. ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
June 23.....	J. C. Keith.....	339	802.32	3.12	....	2503.88
July 25.....	do	295	660.54	2.31	....	1522.86
Aug. 29.....	do	292	619.90	2.41	....	1493.22
Sept. 28.....	H. R. Carscallen.....	294	659.92	2.45	1.28	1618.99
Nov. 2.....	do	264.5	483.87	1.63	0.69	789.88

MISCELLANEOUS DISCHARGE MEASUREMENTS of Red Deer River Drainage Basin, in 1910.

Date.	Stream.	Locality.	Hydrographer.	Width.	Area of Section.	Discharge.
				<i>Feet.</i>		<i>Sec.-ft.</i>
Aug. 26.....	Blood Indian Creek....	10-23-8-4.....	H. R. Carscallen...	3.5	1.70	0.73
" 24.....	Berry CreekEastBranch	12-23-12-4.....	do .....	....	....	Dry
" 24.....	Berry Creek.....	27-23-13-4.....	do	3.4	0.33	0.13
May 5.....	do do	33-22-12-4.....	J. Stewart.....	....	....	10.07
June 25.....	Blindman River.....	Blackfalls, Alta..	J. C. Keith.....	97.0	286.50	107.78
Aug 25.....	Hallam's Ditch.....	3-23-8-4.....	H. R. Carscallen...	5.0	1.50	0.56
June 24.....	Red Deer River.....	21-38-27-4.....	J. C. Keith.....	265.0	810.10	2566.03
" 25.....	do do	32-26-28-4.....	do	165.5	681.10	2187.51

BOW RIVER DRAINAGE BASIN.

General Description.

Bow River heads in Lakes Bow and Hector, elevations 6,420 feet and 5,694 feet respectively above mean sea level, lying just East of the Great Divide in the Rocky Mountain Park of Canada, and flows in South and Easterly direction to Calgary. Here it takes a big bend to the south and then again takes a South and Easterly course to its junction at the Grand Forks with Belly River. From the confluence of these two streams it is known as the South Saskatchewan River. The principal tributaries are the Spray, Cascade, Kananaskis, Ghost, Elbow, Sheep and Highwood Rivers. Cascade and Ghost Rivers drain that portion of the basin lying North of Bow River and Spray, Kananaskis, Elbow, Sheep and Highwood Rivers drain the Southern portion. In addition to these large streams, however, are numerous creeks which drain from the mountains along the upper part of its course. No drainage of any account, however, reaches the river East of the mouth of Highwood River, consequently almost all the run-off comes from the mountains and foothills. As a result, Bow River possesses a normally steady flow throughout the year, but is subject to sudden freshets caused by melting snow and heavy rains in the mountains. The period of minimum flow is during January and February.

The valley of the Bow is deep and fairly wide, the banks in the mountain section being rocky and high, and in the prairie section high and clayey. The upper portion of the basin is heavily timbered, but this all disappears in the lower prairie portion. The bed of the stream is of rock, gravel or sand, and is free from vegetation. The water is clear and pure.

Considerable water is being diverted from Bow River for irrigation purposes, and more will be used in the near future. The Canadian Pacific Irrigation Company are preparing to irrigate about 3,000,000 acres of land lying North of their main line and between Calgary and the line between Ranges 10 and 11, West 4th Mer. The water is being diverted about two miles East of Calgary and also at Bassano. All of their ditch has not been constructed yet, but the work is being rushed to completion. Besides this, the Southern Alberta Land Company has been granted water rights to irrigate about 380,000 acres of land lying to the West of Medicine Hat. The headgates of their canal and their reservoir are near Gleichen.

Many favorable sites for power development are located on the Bow and its tributaries, but up to the present only one of any importance has been developed. This belongs to the Calgary Power and Transmission Company, and is for the purpose of supplying Calgary with electric power. Their dam and power house is just below Kananaskis Falls, their transmission line running a distance of fifty miles to Calgary. At present only 12,000 H.P. is to be developed, but ultimately this will be raised to 30,000 H.P., their power plant being designed to accomodate this increase.

In addition to these projects the city of Calgary draws its domestic water supply from Elbow River. The intake is about 12 miles south-West of Calgary, above which point the course of the river is through a wild and unsettled country, thus insuring the purity of the water supply.

BOW RIVER NEAR LAGGAN.

This station was established July 18th, 1910, by J. C. Keith. It is located at an old traffic bridge on the N.E. quarter Sec. 28, Tp. 28, Rge. 16, W. 5th Mer., about one-third of a mile West of Laggan station, and about 150 yards South of the main line of the Canadian Pacific Railway. The bridge is a low, log structure of two spans, supported by two abutments and a central pier, constructed of heavy timber and filled with rock. A small North channel which carries no water except in high stages is bridged by a small one-span log structure, similar to that over the main stream.

The channel is straight for about one-half mile above the station, except for a slight bend, a short distance above the bridge. The channel is straight for about 900 feet below the station, then bends gradually to the left. The current is swift at the station, making accurate soundings difficult to obtain.

The right bank is low near the water's edge, but rises rapidly; the left bank is low with a gradual rise to the Canadian Pacific Railway tracks. Both banks are covered with brush. The bed of the stream is composed of gravel and large stones. The centre pier divides the stream into two channels in addition to the small North channel mentioned above.

The initial point for soundings in the main channel is a bolt on the North end of the guard timber; the initial point for sounding in the North channel is the inside edge of the north abutment of the small bridge which spans it. Discharge measurements are made from the down stream sides of the two bridges.

The gauge is a plain staff, graduated to feet and hundredths nailed securely to the lower side of the North abutment of the bridge spanning the main channel. It is referred to bench marks as follows:—(1) Top of bolt head at the North end of the guard timber on the up stream side of the bridge; elevation 8.45. (2) Top of bolt head in the guard timber, thirty feet from the South end of the bridge on the up-stream side; elevation 7.75.

It was impossible to get a satisfactory observer during 1910, and therefore only the discharge measurements are published.

DISCHARGE MEASUREMENTS of Bow River near Laggan, in 1910.

Date.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Discharge.
		<i>Feet.</i>	<i>Sq. ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec. ft.</i>
July 18.....	J. C. Keith.....	112.3	300.45	5.832	3.43	1752.30
Aug. 12.....	do	111.3	243.50	4.974	3.02	1202.24
Sept. 2.....	do	73.2	99.70	3.328	2.12	331.79
Sept. 24.....	do	97.8	127.22	3.142	2.285	399.75
Oct. 20.....	H. R. Carscallen.....	85.6	104.74	3.25	2.14	340.63
Nov. 8.....	do	42.0	66.43	2.68	1.66	178.02
Dec. 5.....	do	42.0	57.88	2.084	1.33	120.62
Dec. 29.....	do	42.0	50.33	1.814	1.26	91.31

BOW RIVER AT BANFF.

This station was established May 25th, 1909, by P. M. Sauder. It is located at the highway bridge in the village of Banff, about one mile from the Canadian Pacific Railway Station. It is on the quartering line in the S. $\frac{1}{2}$, Sec. 35, Tp. 25, Rge. 12, W. 5th Mer., about a half mile above the mouth of the Spray River, and a short distance below the Vermilion Lakes.

The channel is straight for about 300 feet above and 400 feet below the station. The current is sluggish above the station, becoming swifter as it approaches the bridge and breaking into rapids a short distance down stream, reaches the Spray Falls about a quarter of a mile below.

The stream is divided into four channels by the piers supporting the bridge. Both banks are low and covered with brush and timber, but are not liable to overflow. The bed of the stream is composed of gravel and boulders, the latter making it difficult to obtain accurate soundings at some points. There is a deep hole at the station near the right bank, but the greater part of the cross-section is uniform.

Discharge measurements are made from the down stream side of the bridge. The initial point for soundings is one and one-half feet from the North end of the bridge. The distances are marked on the bottom chord of the down-stream side of the bridge.

A plain staff gauge, graduated to feet and tenths, is attached vertically to the down-stream side of the centre pier. It is referred to a bench mark on the top of the same pier; elevation 7.52. The gauge was read once daily by N. B. Sanson, Meteorological Observer, at Banff.

DISCHARGE MEASUREMENTS of Bow River at Banff, in 1910.

Date.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Discharge.
		<i>Feet.</i>	<i>Sq. ft.</i>	<i>Fl. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
May 13.....	I. C. Keith.....	304	1107.59	2.553	2.375	2827.20
June 3.....	do.....	317	1255.45	2.99	2.865	3745.43
June 17.....	do.....	322	1595.86	4.205	3.94	6710.95
July 15.....	do.....	320	1528.68	3.927	3.72	6003.60
Aug. 11.....	do.....	315	1265.85	2.94	2.925	3727.37
Aug. 31.....	do.....	274	864.19	1.62	1.83	1403.57
Sept. 22.....	do.....	278	867.97	1.58	1.81	1378.02
Oct. 19.....	H. R. Cascallen.....	283	884.98	1.61	1.90	1428.02
Nov. 5.....	do.....	239.5	729.80	1.16	1.22	844.26
Dec. 1.....	do.....	119	517.85	0.86	*0.82	496.63
Dec. 23.....	do.....	59	182.80	2.23	*0.52	406.85

* Ice Conditions.

DAILY GAUGE HEIGHT AND DISCHARGE of Bow River at Banff, for 1910.

DAY.	April.		May.		June.		July.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....			1.75	1,978	2.85	3,708	3.45	5,190
2.....			1.65	1,865	3.05	4,165	3.4	5,045
3.....			1.65	1,865	2.9	3,815	3.3	4,760
4.....			1.7	1,920	2.7	3,400	3.3	4,760
5.....			1.8	2,035	2.7	3,400	3.3	4,760
6.....			2.15	2,490	2.9	3,815	3.25	4,620
7.....			2.4	2,865	3.25	4,657	3.25	4,620
8.....			2.6	3,210	3.2	4,530	3.35	4,902
9.....			2.7	3,400	3.1	4,285	3.3	4,760
10.....	.3		2.65	3,305	3.1	4,285	3.3	4,760
11.....	.3		2.45	2,947	3.7	5,980	3.3	4,760
12.....	.35		2.35	2,788	4.35	8,120	3.4	5,045
13.....	.5		2.35	2,787	4.05	7,100	3.5	5,335
14.....	.4		2.3	2,710	3.65	5,782	3.65	5,783
15.....	.35		2.2	2,560	3.6	5,630	3.7	5,935
16.....	4		2.1	2,420	3.8	6,250	3.75	6,092
17.....	.4		2.1	2,420	3.9	6,575	3.8	6,250
18.....	.4		2.25	2,635	4.1	7,265	3.8	6,250
19.....	.5		2.25	2,635	3.7	5,935	3.65	5,783
20.....	.75		2.2	2,560	3.85	6,413	3.5	5,335
21.....	.8		2.2	2,560	4.05	7,088	3.45	5,190
22.....	.8		2.3	2,710	3.65	5,782	3.35	4,902
23.....	.85		2.7	3,400	3.35	4,903	3.25	4,620
24.....	1.15		3.0	4,045	3.2	4,480	3.15	4,343
25.....	1.55		3.35	4,915	3.1	4,205	2.95	3,792
26.....	1.9	2,155	3.7	5,940	3.4	5,045	2.9	3,655
27.....	2.1	2,420	3.55	5,475	3.7	5,935	2.75	3,243
28.....	2.1	2,420	3.2	4,530	3.8	6,250	2.7	3,105
29.....	1.95	2,220	2.95	3,930	3.75	6,092	2.6	2,855
30.....	1.85	2,095	2.75	3,500	3.55	5,483	2.6	2,855
31.....			2.7	3,400			2.7	3,105

From April 10th to 25th, curve not sufficiently defined to read discharge.



Meters and equipment for measuring the discharge of a stream by the velocity method.



Gauge on Milk River at Spencer's Lower Rancho.

DAILY GAUGE HEIGHT AND DISCHARGE of Bow River at Banff, for 1910.—Continued.

DAY.	August.		September.		October.		November.		December.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.
1.....	2.7	3,105	1.8	1,370	1.5	1,055	1.3	905	0.82	496
2.....	2.65	2,980	1.8	1,370	1.5	1,055	1.3	905	.....	.....
3.....	2.55	2,732	1.8	1,370	1.5	1,055	1.3	905	.....	.....
4.....	2.6	2,855	1.9	1,500	1.45	1,015	1.25	872	0.75	475
5.....	2.75	3,243	1.85	1,435	1.4	975	1.2	840	.....	.....
6.....	3.1	4,205	1.95	1,573	1.4	975	1.2	840	0.79	487
7.....	3.1	4,205	1.85	1,435	1.6	1,150	1.2	840	0.77	481
8.....	2.95	3,792	1.8	1,370	1.55	1,102	1.2	840	0.8	490
9.....	3.0	3,930	1.7	1,255	1.6	1,150	1.2	840	0.79	487
10.....	3.0	3,930	1.7	1,255	1.9	1,500	1.2	840	0.68	454
11.....	2.95	3,793	1.6	1,150	1.9	1,500	1.2	840	0.6	430
12.....	2.9	3,655	1.6	1,150	1.85	1,435	1.1	780	0.73	469
13.....	2.85	3,517	1.6	1,150	1.8	1,370	1.15	810	0.75	475
14.....	2.8	3,380	1.5	1,055	1.75	1,313	0.8	630	0.70	460
15.....	2.75	3,243	1.5	1,055	1.75	1,312	1.05	753	0.64	442
16.....	2.6	2,855	1.5	1,055	1.8	1,370	0.9	675	0.67	451
17.....	2.55	2,732	1.5	1,055	1.85	1,435	:	.....	0.71	463
18.....	2.45	2,498	1.55	1,102	1.9	1,500	.....	.....	0.66	448
19.....	2.4	2,385	1.6	1,150	1.85	1,435	.....	.....	0.64	442
20.....	2.5	2,610	1.65	1,203	1.8	1,370	.....	.....	0.60	430
21.....	2.45	2,497	1.75	1,312	1.8	1,370	.....	.....	0.66	448
22.....	2.4	2,385	1.8	1,370	1.7	1,255	.....	.....	0.50	404
23.....	2.35	2,283	1.8	1,370	1.7	1,255	.....	.....	0.57	421
24.....	2.25	2,085	1.85	1,435	1.6	1,150	.....	.....	0.68	454
25.....	2.15	1,900	1.75	1,313	1.6	1,150	.....	.....	0.65	445
26.....	2.05	1,727	1.7	1,255	1.55	1,103	.....	.....	0.65	445
27.....	2.0	1,645	1.6	1,150	1.35	940	.....	.....	0.64	442
28.....	2.0	1,645	1.6	1,150	1.45	1,015	.....	.....	0.60	430
29.....	1.9	1,500	1.6	1,150	1.45	1,015	.....	.....	0.59	427
30.....	1.85	1,435	1.6	1,150	1.45	1,015	.....	.....	0.63	439
31.....	1.8	1,370	.....	.....	1.4	975	.....	.....	0.44	392

* Ice conditions during all the month of December. † No gauge height observations from Nov. 17 to Dec. 1.

MONTHLY DISCHARGE of Bow River at Banff, for 1910.

Drainage area, 845 square miles.

MONTH.	DISCHARGE IN SECOND-FEET.				RUN-OFF.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on Drainage area.	Total in acre-feet.
April 26-30.....	2,420	2,095	2,262	2.68	.498	22,433
May.....	5,940	1,865	3,090	3.66	4.22	190,018
June.....	8,120	3,400	5,345.8	6.32	7.05	318,098
July.....	6,250	2,855	4,722.9	5.59	6.445	290,400
August.....	4,205	1,370	2,778	3.29	3.79	170,816
September.....	1,573	1,055	1,257	1.49	1.66	74,806
October.....	1,500	940	1,203.7	1.42	1.637	74,010
November 1-16.....	905	630	819	.97	.577	26,014
December, 28 days.....	496	392	451	.53	.55	25,047
The period.....						1,391,642

BOW RIVER NEAR MORLEY.

This station was established May 25th, 1910, by J. C. Keith. It is located at the traffic bridge on Sec. 22, Tp. 25, Rge. 7, W. 5th Mer., in the Stony Indian Reserve, a short distance from the Indian Agency and about $\frac{3}{4}$ of a mile North of the Village of Morley.

Discharge measurements are made from the down-stream side of the bridge, which is a two span steel structure, supported by concrete abutments and pier, with a short wooden approach on the South side, supported by piles. The initial point for soundings is the anchor bolt in the bed plate on the North pier, and distances are marked to every five feet on the bottom chord of the bridge.

The channel is straight for about 600 feet above the station, then curves slightly to the right, but is almost straight for more than half-a-mile. It is straight for about 500 feet below the station, then curves sharply to the left. The right bank is low and partly covered with brush, but is not liable to overflow. The left bank is high, steep, gravelly and free from brush. The bed of the stream is composed of sand and gravel. The current is swift but smooth.

The gauge is the standard chain type, and is fixed to the floor of the bridge near the centre pier. The length of chain from the bottom of the weight to the marker is 19.17 feet. The gauge is referred to bench marks as follows:—(1) A wooden block nailed to the down-stream pile in the first row supporting the approach on the left bank; elevation 12.09. (2) The top of a nut on a bolt in the pile nearest to the South abutment, elevation 8.58. It is read once each day by S. Christianson, who lives about 350 yards south-East of the bridge.

DISCHARGE MEASUREMENTS of Bow River near Morley, in 1910.

Date.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Discharge.
		<i>Feet.</i>	<i>Sq. ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
May 26.....	J. C. Keith.....	222.7	1,466.59	6.44	4.90	9,443.54
June 21.....	do	235.7	1,610.50	7.49	5.55	12,066.97
July 14.....	do	217.7	1,422.58	5.96	4.74	8,476.01
Aug. 9.....	do	207.4	1,207.23	4.96	3.80	5,990.30
Aug. 30.....	do	182.2	933.94	3.26	2.37	3,047.86
*Sept. 21.....	do	182.2	926.86	3.22	2.38	2,987.93
†Sept. 21.....	do	182.2	926.86	3.23	2.38	2,989.38
Oct. 17.....	H. R. Carscallen.....	179.5	903.80	3.06	2.30	2,767.68
Nov. 4.....	do	175.5	799.30	2.29	1.63	1,829.87
Nov. 30.....	do	155.5	733.35	1.61	1.22	1,177.06
Dec. 22.....	do	154.0	463.81	1.83	1.16	847.19

* One point method used.
† Two point method used.

DAILY GAUGE HEIGHT AND DISCHARGE of Bow River near Morley, for 1910.

DAY.	May.		June.		July.		August.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec. ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....			4.15	6,910	4.85	9,255	3.45	5,185
2.....			4.4	7,660	4.9	9,440	3.4	5,070
3.....			4.25	7,195	4.6	8,350	3.3	4,850
4.....			4.05	6,635	4.55	8,175	3.25	4,740
5.....			3.85	6,115	4.5	8,000	3.55	5,415
6.....			4.0	6,500	4.5	8,000	4.0	6,500
7.....			4.45	7,830	4.45	7,830	4.05	6,635
8.....			4.55	8,175	4.5	8,000	4.0	6,500
9.....			4.4	7,660	4.55	8,175	3.85	6,115
10.....			4.4	7,660	4.45	7,830	3.85	6,115
11.....			4.8	9,070	4.45	7,830	3.75	5,875
12.....			5.65	12,475	4.55	8,175	3.75	5,875
13.....			5.7	12,680	4.7	8,700	3.7	5,760
14.....			5.2	10,640	4.85	9,255	3.65	5,645
15.....			5.05	10,040	4.85	9,255	3.6	5,530
16.....			5.35	11,245	4.95	9,640	3.5	5,300
17.....			5.5	11,860	4.8	9,070	3.35	4,960
18.....			5.8	13,090	4.9	9,440	3.25	4,740
19.....			5.35	11,245	4.75	8,885	3.2	4,630
20.....			5.35	11,245	4.55	8,175	3.1	4,410
21.....			5.7	12,680	4.45	7,830	3.1	4,410
22.....			5.4	11,450	4.4	7,660	3.05	4,305
23.....			5.0	9,840	4.3	7,340	3.0	4,200
24.....			4.65	8,525	4.2	7,050	2.95	4,095
25.....	4.6	8,350	4.45	7,830	3.9	6,240	2.75	3,685
26.....	5.1	10,240	4.7	8,700	3.95	6,370	2.65	3,485
27.....	5.15	10,440	5.0	9,840	3.8	5,990	2.55	3,305
28.....	4.8	9,070	5.25	10,840	3.7	5,760	2.55	3,305
29.....	4.4	7,660	5.25	10,840	3.8	5,990	2.45	3,115
30.....	4.2	7,050	5.0	9,840	3.77	5,921	2.38	2,986
31.....	4.0	6,500			3.8	5,990	2.36	2,952

DAILY GAUGE HEIGHT AND DISCHARGE of Bow River near Morley, for 1910.—Continued.

DAY.	September.		October.		November.		December.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.
1.....	2.33	2,901	2.1	2,520	1.67	1,888	1.2	*1,150
2.....	2.28	2,816	2.08	2,490	1.7	1,930	1.4	*1,380
3.....	2.18	2,648	2.0	2,370	1.65	1,860	1.38	*1,340
4.....	2.27	2,799	2.0	2,370	1.7	1,930	1.28	*1,210
5.....	2.35	2,935	1.95	2,295	1.64	1,846	1.47	*1,430
6.....	2.45	3,115	1.9	2,220	1.66	1,874	1.49	*1,440
7.....	2.5	3,210	2.0	2,370	1.6	1,790	1.55	*1,510
8.....	2.43	3,077	2.1	2,520	1.5	1,660	1.46	*1,380
9.....	2.25	2,765	2.05	2,445	1.53	1,699	1.45	*1,350
10.....	2.2	2,680	2.2	2,680	1.55	1,725	1.53	*1,440
11.....	2.23	2,731	2.3	2,850	1.52	1,686	1.5	*1,400
12.....	2.13	2,568	2.35	2,935	1.53	1,699	1.25	*1,080
13.....	2.12	2,552	2.25	2,765	1.45	1,595	1.45	*1,300
14.....	2.07	2,475	2.27	2,799	1.5	1,660	1.4	*1,220
15.....	2.07	2,475	2.15	2,600	1.45	*1,595	1.25	*1,030
16.....	2.1	2,520	2.15	2,600	1.4	*1,530	1.23	*1,000
17.....	2.23	2,731	2.3	2,850	1.34	*1,440	1.27	*1,020
18.....	2.25	2,765	2.38	2,986	1.25	*1,320	1.3	*1,050
19.....	2.3	2,850	2.32	2,884	1.37	*1,470	1.2	* 920
20.....	2.35	2,935	2.24	2,748	1.37	*1,460	1.2	* 920
21.....	2.33	2,901	2.2	2,680	1.36	*1,440	1.19	* 890
22.....	2.4	3,020	2.15	2,600	1.33	*1,390	1.15	* 840
23.....	2.44	3,096	2.1	2,520	1.34	*1,400	1.25	* 870
24.....	2.33	2,901	2.04	2,430	1.45	*1,520	1.25	* 800
25.....	2.4	3,020	2.05	2,445	1.0	* 970	1.3	* 770
26.....	2.37	2,969	2.0	2,370	1.0	* 960	1.47	* 900
27.....	2.25	2,765	1.93	2,265	1.0	* 950	1.6	* 990
28.....	2.15	2,600	1.86	2,160	1.03	* 980	1.55	* 860
29.....	2.11	2,536	1.8	2,070	1.15	*1,100	1.7	* 970
30.....	2.06	2,460	1.75	2,000	1.23	*1,190	2.35	* 980
31.....			1.73	1,972			2.25	* 990

* Changing conditions due to ice: Nov. 15th to Dec. 31st.

MONTHLY DISCHARGE of Bow River near Morley, for 1910.

Drainage area, 2,099 square miles.

MONTH.	DISCHARGE IN SECOND-FEET.				RUN-OFF.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on Drainage area.	Total in acre-feet.
May (25-31).....	10,440	6,500	8,472.8	4.03	1.04	117,639
June.....	13,090	6,115	9,543.8	4.54	5.06	567,894
July.....	9,640	5,760	7,858.7	3.74	4.31	483,211
August.....	6,635	2,952	4,828.8	2.30	2.65	297,916
September.....	3,210	2,460	2,793.8	1.33	1.48	166,244
October.....	2,986	1,972	2,509.9	1.20	1.38	154,324
November.....	1,930	950	1,518.6	.72	.80	90,366
December.....	1,510	770	1,110.6	.53	.61	68,287
The period.....						1,945,881

BOW RIVER AT CALGARY.

This station was established May 5th, 1908, by P. M. Sauder. It is located at the Cushing traffic bridge on the North side of Sec. 12, Tp. 24, Rge. 1, W. 5th Mer. It is below the mouths of Elbow River and Nose Creek, and the Intake of the Canadian Pacific Railway Company's Canal.

At ordinary stages the stream is divided into two channels by the first pier from the right bank, and at high water and flood stages it is divided into three channels by the piers. The right bank is high and does not overflow, but some years ago the flat on the East side was submerged for a short period during an excessive flood. In recent years a dyke was built along the left bank to confine the stream within its banks at all stages. The bed and banks are liable to shift during high water and flood stages of the stream. The channel is straight for 300 feet above the station; above this there is a gravel bar, around which the stream shifts from time to time. The channel is straight to a point about 400 feet below the station, beyond which it gradually turns towards the left.

Discharge measurements are made from the bridge at all stages. The initial point for soundings is the West side of the left abutment. The distances are marked at every five feet on the bottom chord of the down-stream side of the bridge.

The gauge which is of the standard chain type is read daily by James Millen, who lives about 200 yards from the West end of the bridge. The length of the chain is 20.30 feet. The gauge is referred to a bench mark on the first pier from the left bank; elevation 9.91.

DISCHARGE MEASUREMENTS of Bow River at Calgary, in 1910.

Date.		Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Discharge.
			<i>Feet.</i>	<i>Sq. ft.</i>	<i>Fl. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
May	12.....	J. C. Keith.....	224.5	1,739.00	3.90	5.31	6,774.50
May	28.....	do	282.5	2,082.38	5.77	6.58	12,020.62
June	16.....	do	281.5	2,093.18	5.38	6.585	11,265.10
June	22.....	do	296.0	2,120.70	5.87	7.145	12,455.85
July	12.....	do	255.5	1,819.72	4.45	5.895	8,100.98
Aug.	6.....	do	227.0	1,733.50	3.90	5.475	6,755.10
Aug.	18.....	do	220.5	1,599.68	3.18	4.95	5,081.93
Sept.	20.....	do	207.0	1,451.90	2.50	4.20	3,640.74
Oct.	14.....	H. R. Carscallen.....	200.0	1,434.11	2.41	4.17	3,457.45

DAILY GAUGE HEIGHT AND DISCHARGE of Bow River, at Calgary, for 1910.

DAY.	April.		May.		June.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....			4.6	4,860	5.8	8,380
2.....			4.5	4,620	6.0	9,070
3.....			4.2	3,930	6.1	9,430
4.....			4.2	3,930	5.8	8,380
5.....			4.2	3,930	5.6	7,710
6.....			4.1	3,700	5.9	8,720
7.....	2.7	760	4.6	4,860	5.9	8,720
8.....	2.9	1,160	5.1	6,190	6.3	10,170
9.....	2.9	1,160	5.2	6,480	6.1	9,430
10.....	2.9	1,160	5.5	7,390	6.0	9,070
11.....	2.9	1,160	5.6	7,710	6.2	9,800
12.....	2.9	1,160	5.4	7,080	7.1	13,240
13.....	2.9	1,160	5.2	6,480	7.3	14,020
14.....	2.9	1,160	5.1	6,190	6.8	12,070
15.....	2.9	1,160	5.0	5,910	6.7	11,680
16.....	2.9	1,160	4.9	5,640	6.7	11,680
17.....	2.9	1,160	4.9	5,640	*6.7	11,560
18.....	2.9	1,160	4.8	5,360	*7.3	13,640
19.....	2.9	1,160	4.9	5,640	*7.1	12,760
20.....	3.0	1,360	4.9	5,640	*6.9	11,800
21.....	3.0	1,360	4.9	5640	*6.9	11,680
22.....	3.1	1,560	4.8	5,360	7.0	11,880
23.....	3.2	1,760	5.0	5,910	6.6	10,430
24.....	3.2	1,760	5.6	7,710	6.3	9,330
25.....	3.5	2,380	5.9	8,720	6.1	8,710
26.....	4.0	3,470	6.5	10,920	6.1	8,710
27.....	4.2	3,930	6.8	12,070	6.4	9,730
28.....	4.5	4,620	6.6	11,300	6.6	10,430
29.....	4.7	5,110	6.5	10,920	6.6	10,430
30.....	4.6	4,860	6.0	9,070	6.5	10,080
31.....			5.8	8,380		

* Changing conditions.

DAILY GAUGE HEIGHT AND DISCHARGE of Bow River, at Calgary, for 1910.—Continued.

DAY.	July.		August.		September.		October	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.
1.....	6.5	10,080	4.8	4,910	4.1	3,310	3.9	2,900
2.....	6.3	9,390	4.8	4,910	4.0	3,100	3.9	2,900
3.....	6.1	8,710	4.8	4,910	4.0	3,100	3.9	2,900
4.....	6.1	8,710	4.8	4,910	4.0	3,100	3.9	2,900
5.....	6.0	8,380	4.9	5,160	4.1	3,310	3.8	2,710
6.....	5.9	8,060	5.475	6,745	4.3	3,740	3.8	2,710
7.....	5.9	8,060	5.7	7,430	4.3	3,740	3.9	2,900
8.....	5.9	8,060	5.6	7,120	4.3	3,740	4.0	3,100
9.....	5.9	8,060	5.4	6,520	4.2	3,520	4.0	3,100
10.....	5.9	8,060	5.4	6,520	4.1	3,310	4.0	3,100
11.....	5.9	8,060	5.4	6,520	4.0	3,100	4.2	3,520
12.....	5.9	8,060	5.4	6,520	4.0	3,100	4.2	3,520
13.....	5.9	8,060	5.4	6,520	4.0	3,100	4.3	3,740
14.....	6.0	8,380	5.4	6,520	4.0	3,100	4.2	3,520
15.....	6.1	8,710	5.4	6,520	4.1	3,310	4.2	3,520
16.....	6.3	9,390	5.3	6,230	4.1	3,310	4.1	3,310
17.....	6.3	9,390	5.2	5,950	4.3	3,740	4.2	3,520
18.....	6.3	9,390	5.0	5,420	4.3	3,740	4.2	3,520
19.....	6.3	9,390	4.8	4,910	4.3	3,740	4.3	3,740
20.....	6.3	9,390	4.8	4,910	4.3	3,740	4.2	3,520
21.....	6.3	9,390	4.8	4,910	4.3	3,740	4.2	3,520
22.....	6.1	8,710	4.8	4,910	4.3	3,740	4.1	3,310
23.....	5.9	8,060	4.7	4,660	4.3	3,740	4.0	3,100
24.....	5.7	7,430	4.7	4,660	4.3	3,740	4.0	3,100
25.....	5.5	6,820	4.5	4,190	4.3	3,740	4.0	3,100
26.....	5.3	6,230	4.4	3,960	4.3	3,740	3.9	2,900
27.....	5.2	5,950	4.3	3,740	4.2	3,520	3.8	2,710
28.....	5.0	5,420	4.2	3,520	4.1	3,310	3.7	2,520
29.....	4.9	5,160	4.1	3,310	4.0	3,100	3.6	2,330
30.....	4.8	4,910	4.1	3,310	3.9	2,900	3.6	2,330
31.....	4.8	4,910	4.1	3,310	.....	.....	3.6	2,330

MONTHLY DISCHARGE of Bow River at Calgary, for 1910.

Drainage area, 3,900 square miles.

MONTH.	DISCHARGE IN SECOND-FEET.				RUN-OFF.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on Drainage area.	Total in acre-feet.
April 6-31.....	5,110	760	1,952	0.500	0.446	92,925
May.....	12,070	3,700	6,683	1.710	1.970	410,935
June.....	14,020	7,710	10,427	2.670	2.980	620,429
July.....	10,080	4,910	7,961	2.040	2.350	489,480
August.....	7,430	3,310	5,279	1.350	1.560	324,094
September.....	3,740	2,900	3,441	0.882	0.984	204,730
October.....	3,740	2,330	3,094	0.793	0.914	190,216
The period.....	.....	.....	.....	.....	.....	2,332,809

CANADIAN PACIFIC RAILWAY COMPANY'S CANAL NEAR CALGARY.

This station was established May 9, 1908, by P. M. Sauder. It is about four miles from the intake, at the bridge (No. 2) on the road allowance on the East side of Sec. 36, Tp. 23, Rge. 1, W. of the 5th Mer.

A plain staff gauge, graduated to feet and hundredths, is fastened to a pile on the up-stream side of the bridge. Discharge measurements are made from the down-stream side of the bridge. The initial point for soundings is the inside of the first plank of the floor on the North end of the bridge. The right bank of the ditch is composed of a mixture of clay and gravel, while the bottom

and left bank is composed of clay only. The bottom of the ditch is below grade at this point. The canal carries water only during the irrigating season. There are no laterals from the ditch above the gauging station.

As no observer was available at the regular station during 1910, an auxiliary gauge was established on the S. E. $\frac{1}{4}$ Sec. 13, Tp. 24, Rge. 1, W. 5th Mer., at a point about 400 yards below the headgates of the canal. It is in the left bank and is referred to bench marks as follows:— (1) Top of concrete pyramid about 40 feet North-East of the gauge 16.84. (2) On top of a square timber post 15 feet North of the gauge; elevation 11.14. It was read by A. Hatcher, head ditch rider for the Company.

Discharge measurements were made near the gauge when the canal could be waded and during the higher stages at bridge No. 2.

DISCHARGE MEASUREMENTS of Canadian Pacific Railway Company's Canal near Calgary, in 1910.

Date.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Discharge.
		<i>Feet.</i>	<i>Sq. ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
May 9.....	J. C. Keith.....	54.5	156.9	1.78	2.4	279.46
May 21.....	do	63.5	70.02	2.2	1.55	154.18
June 15.....	do	55.0	133.27	1.54	2.0	205.25
June 27.....	do	55.5	200.98	2.15	3.3	432.28
July 13.....	do	56.0	226.46	2.15	3.64	486.75
Aug. 8.....	do	56.0	220.78	2.226	3.6	491.5
Aug. 27.....	do	56.0	184.73	1.87	2.7	343.45
Sept. 10.....	do	55.5	150.32	1.54	2.245	231.7
Oct. 3.....	H. R. Carscallen.....	60.7	206.79	1.9	3.01	391.94
Oct. 14.....	do	11.0	5.48	0.651	0.45	3.57

DAILY GAUGE HEIGHT AND DISCHARGE of Canadian Pacific Railway Company's Canal near Calgary, for 1910.

DAY.	April.		May.		June.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....			1.8	186	2.0	216
2.....			1.8	186	1.25	106
3.....			1.75	178	0.25	.....
4.....			1.7	171	0.65	28
5.....			1.7	171	1.3	113
6.....			1.7	171	1.6	156
7.....			1.75	178	1.7	171
8.....			1.9	201	1.7	171
9.....			2.35	271	1.7	171
10.....			2.4	279	1.7	171
11.....			1.65	163	1.8	186
12.....			1.6	156	2.05	224
13.....			1.5	141	2.1	231
14.....			1.5	141	2.1	231
15.....			1.5	141	2.0	216
16.....			1.5	141	2.7	328
17.....			1.5	141	2.7	328
18.....			1.5	141	0.0	.....
19.....			1.4	127	1.85	194
20.....			1.5	141	1.6	156
21.....			1.5	141	2.0	216
22.....			1.5	141	2.2	247
23.....			1.9	201	2.2	247
24.....			1.9	201	2.5	295
25.....			2.2	247	2.65	320
26.....			2.2	247	3.05	388
27.....	1.8	186	2.2	247	3.3	432
28.....	1.8	186	2.0	216	3.3	432
29.....	1.9	201	2.0	216	3.3	432
30.....	1.85	193	2.0	216	3.35	441
31.....			2.0	216	.....	.....

SESSIONAL PAPER No. 25d

DAILY GAUGE HEIGHT AND DISCHARGE of Canadian Pacific Railway Company's Canal near Calgary, for 1910.—Continued.

DAY.	July.		August.		September.		October.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.
1.....	3.4	449	3.8	521	2.3	263	2.77	340
2.....	3.45	458	3.8	521	2.3	263	2.85	354
3.....	3.6	485	3.6	485	2.25	255	2.9	362
4.....	3.9	539	3.6	485	2.35	271	3.0	379
5.....	4.15	586	3.6	485	2.35	271	2.65	320
6.....	4.3	615	3.6	485	2.35	271	2.15	240
7.....	4.3	615	3.6	485	2.3	263	1.62	159
8.....	4.3	615	3.6	485	2.3	263	.80	46
9.....	4.3	615	3.6	485	2.3	263	.55	17
10.....	4.3	615	3.6	485	2.3	263	.35	*
11.....	4.0	558	3.09	395	2.35	271		
12.....	3.7	503	2.54	302	2.33	268		
13.....	3.7	503	2.53	300	1.65	164		
14.....	3.85	530	2.25	255	1.0	72		
15.....	4.3	615	2.25	255	1.0	72		
16.....	4.5	653	2.2	247	.92	62		
17.....	4.35	625	2.0	216	.93	63		
18.....	4.3	615	2.15	240	.95	66		
19.....	3.8	521	2.3	263	1.8	186		
20.....	3.7	503	2.25	255	2.52	299		
21.....	3.7	503	2.2	247	2.38	276		
22.....	3.7	503	2.2	247	2.5	295		
23.....	3.6	485	2.35	271	2.0	216		
24.....	3.8	521	2.6	312	2.0	216		
25.....	4.05	567	2.65	320	2.0	216		
26.....	4.0	558	2.7	328	2.0	216		
27.....	4.1	577	3.05	388	1.97	212		
28.....	4.05	567	3.5	467	1.95	209		
29.....	4.0	558	3.0	379	2.35	271		
30.....	3.8	521	3.0	379	2.75	337		
31.....	3.8	521	3.0	379				

* Canal closed for the season.

MONTHLY DISCHARGE of Canadian Pacific Railway Company's Canal near Calgary, for 1910.

MONTH.	DISCHARGE IN SECOND-FEET.			Total Discharge in acre-feet.
	Maximum.	Minimum.	Mean.	
April (27-30).....	201	186	191.5	1,519
May.....	297	141	184.3	11,333
June.....	432		228.2	13,578
July.....	653	449	551.6	33,918
August.....	521	216	366.7	22,547
September.....	337	62	221.1	12,055
October (1-10).....	379		221.7	4,396
The period.....				99,346

BOW RIVER NEAR NAMAKA.

This station was established in September, 1909, by P. M. Sauder. It is located near the dam and headgate of the Southern Alberta Land Company, on Sec. 31, Tp. 21, Rge. 25, W. 4th Mer. It is 11 miles by trail from Namaka and 15 miles from Langdon.

The river is divided into two channels at this point by an island. The greater volume of water flows through the South or right channel. In 1909, the Southern Alberta Land Company constructed a dam across the North channel and during the period covered by the records in this report there was no flow in this channel. When the dam is constructed across the South channel water will flow in both channels again, and if it is decided to continue observations at this point, a gauging station will be established on the North channel.

Discharge measurements are made on the South channel from a cable about 1,000 feet below the intake of the Southern Alberta Land Company's ditch. The channel is straight for 600 feet above and 800 feet below the cable. Both banks are high, free from brush, and not liable to overflow. The bed is composed of gravel and may shift during high stages of the stream. The current is fairly swift but uniform.

The gauge which is a plain staff, graduated to feet and hundredths, is fixed in a stilling box, in the right bank, about 400 feet up-stream from the cable. It is referred to a bench mark on the North end of the Headgate of the S. A. L. Co.'s Ditch; elevation 23.28. It is read by F. A. Wallace, C.E., Resident Engineer for the Southern Alberta Land Co.

The records at this station do not include the water diverted by the Canadian Pacific Railway Company.

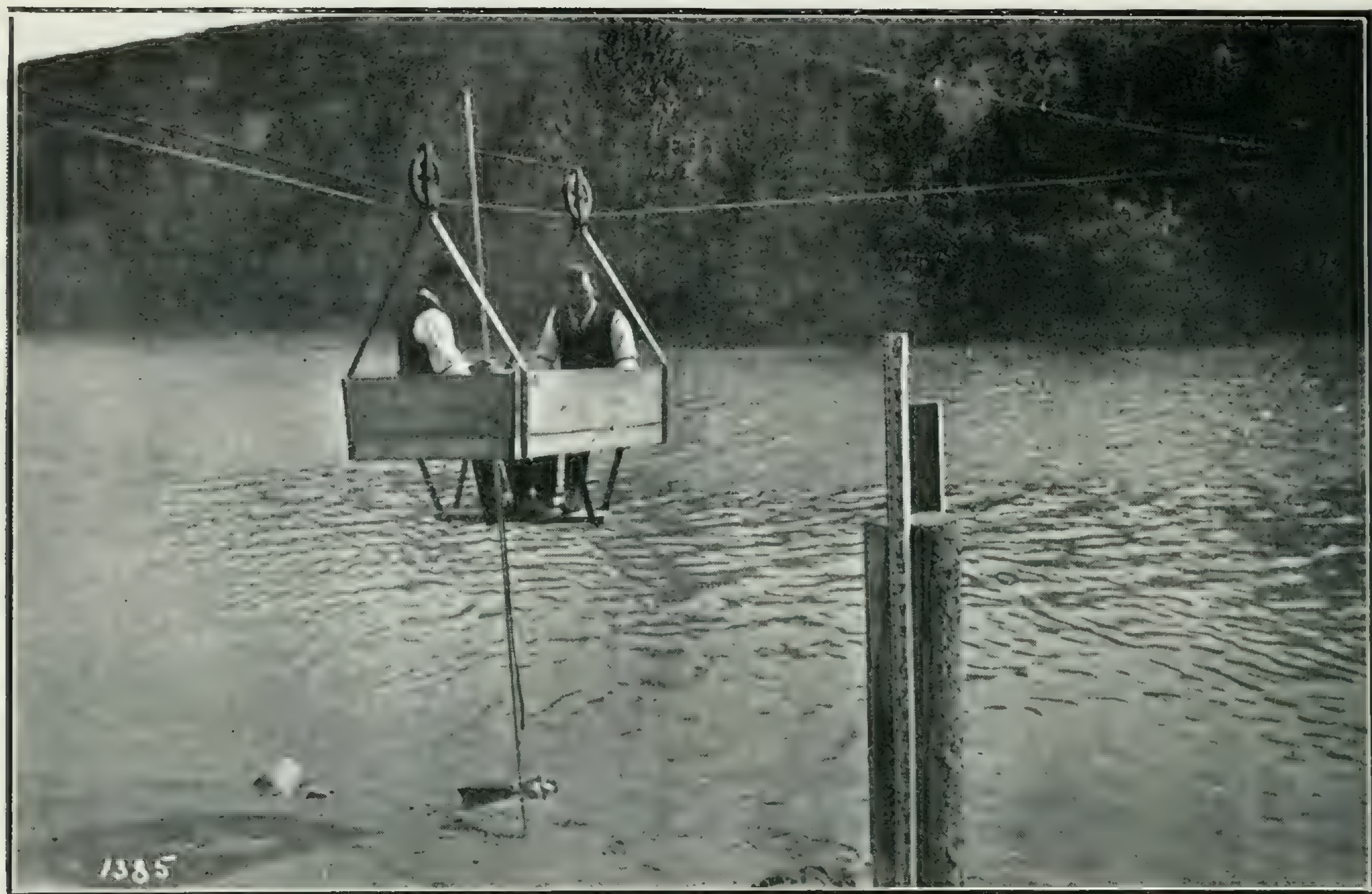
DISCHARGE MEASUREMENTS of Bow River near Namaka, in 1910.

Date.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Discharge.
May 17.....	P. M. Sauder.....	351	1,364.6	4.499	1.84	6,137.76
May 31.....	J. C. Keith.....	363	1,723.95	5.68	2.9	9,799.24
June 13.....	do	380	2,176.75	6.81	4.075	14,820.54
July 27.....	do	355	1,267.25	4.8	2.295	6,079.05
Aug. 25.....	do	348	1,045.15	4.29	1.67	4,488.78
Sept. 17.....	do	345	976.75	4.19	1.53	4,091.01
Nov. 15.....	H. R. Carscallen.....	303	764	3.07	0.31	2,342.66

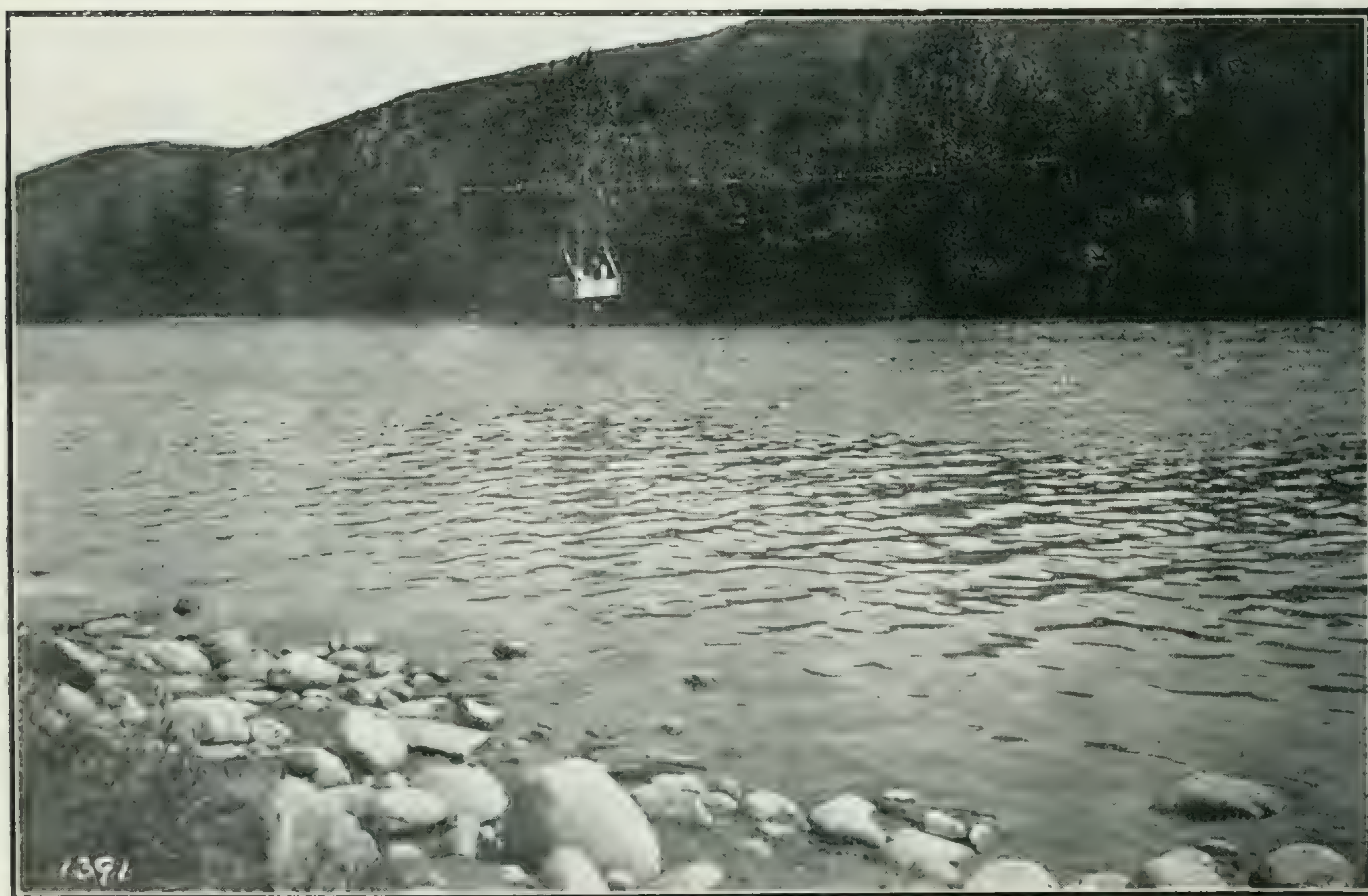
DAILY GAUGE HEIGHT AND DISCHARGE of Bow River, near Namaka, for 1910.

DAY.	March.		April.		May.		June.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....			0.05	2,333	1.4	4,965	2.75	9,218
2.....			0.02	2,232	1.28	4,679	2.88	9,722
3.....			0.2	1,985	1.25	4,610	2.86	9,644
4.....			0.3	1,855	1.1	4,275	2.82	9,488
5.....			0.09	2,134	1.07	4,209	2.8	9,410
6.....			0.13	2,079	1.12	4,319	2.7	9,025
7.....			0.19	1,999	1.3	4,725	2.8	9,410
8.....			0.19	1,998	1.7	5,745	2.93	9,918
9.....			0.19	1,999	2.1	6,915	2.98	10,116
10.....			0.13	2,078	2.3	7,575	3.15	10,798
11.....			0.07	2,162	2.45	8,095	3.05	10,395
12.....			0.17	2,026	2.3	7,575	3.4	11,810
13.....			0.15	2,057	2.15	7,075	*4.04	14,670
14.....			0.08	2,148	2.06	6,793	3.95	14,140
15.....			0.12	2,093	2.01	6,640	3.65	12,660
16.....			0.13	2,079	1.97	6,522	3.5	11,870
17.....			0.15	2,057	1.85	6,170	3.75	12,820
18.....			0.17	2,026	1.76	5,913	3.95	13,560
19.....			0.12	2,093	1.9	6,315	3.82	12,820
20.....			0.01	2,274	1.95	6,462	3.8	12,580
21.....			0.14	2,467	1.95	6,463	3.8	12,400
22.....			0.22	2,592	1.92	6,374	4.0	13,080
23.....	2.5	8,270	0.25	2,640	1.9	6,315	3.4	10,330
24.....	3.0	10,195	0.3	2,720	2.18	7,171	3.2	9,340
25.....	2.9	9,800	0.35	2,805	2.65	8,835	*3.05	8,577
26.....	2.7	9,025	0.55	3,158	3.1	10,595	3.1	8,760
27.....	1.9	6,315	0.90	3,845	3.5	12,225	3.2	9,140
28.....	1.7	5,745	1.24	4,587	3.65	12,875	3.3	9,530
29.....	1.55	5,345	1.6	5,475	3.4	11,810	3.35	9,730
30.....	0.9	3,845	1.53	5,293	3.1	10,595	3.50	10,340
31.....	0.55	3,157			2.88	9,722		

* Changing conditions, June 13th to June 25th. Bolster method used.



Cable Car and Gauge on Elbow River at Calgary, Alta.



Cable and Car on Elbow River at Calgary, Alta.

DAILY GAUGE HEIGHT AND DISCHARGE of Bow River, near Namaka, for 1910.—Continued.

DAY.	July.		August.		September.		October.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.
1.....	3.4	9,930	2.0	5,265	1.25	3,620	1.25	3,620
2.....	3.25	9,335	2.0	5,265	1.25	3,620	1.25	3,620
3.....	3.2	9,140	1.95	5,138	1.22	3,569	1.26	3,637
4.....	3.2	9,140	1.9	5,010	1.2	3,535	1.15	3,455
5.....	3.15	8,950	1.8	4,760	1.2	3,535	1.2	3,535
6.....	2.95	8,218	2.1	5,530	1.2	3,535	1.2	3,535
7.....	2.95	8,218	2.7	7,360	1.4	3,885	1.2	3,535
8.....	2.9	8,040	2.7	7,360	1.6	4,290	1.2	3,535
9.....	2.9	8,040	2.6	7,030	1.55	4,183	1.4	3,885
10.....	2.9	8,040	2.6	7,030	1.53	4,139	1.3	3,705
11.....	2.9	8,040	2.5	6,705	1.55	4,183	1.4	3,885
12.....	2.87	7,937	2.47	6,609	1.55	4,182	1.5	4,075
13.....	2.9	8,040	2.45	6,545	1.55	4,183	1.55	4,182
14.....	2.95	8,217	2.45	6,545	1.53	4,139	1.5	4,075
15.....	3.05	8,578	2.4	6,385	1.53	4,140	1.4	3,885
16.....	3.1	8,760	2.35	6,232	1.53	4,139	1.32	3,741
17.....	3.1	8,760	2.28	6,024	1.45	3,980	1.33	3,759
18.....	3.15	8,950	2.05	5,398	1.4	3,885	1.35	3,795
19.....	3.2	9,140	2.0	5,265	1.3	3,705	1.4	3,885
20.....	3.1	8,760	1.98	5,214	1.3	3,705	1.46	3,999
21.....	3.0	8,395	1.9	5,010	1.35	3,795	1.3	3,705
22.....	2.85	7,867	1.9	5,010	1.38	3,849	1.26	3,637
23.....	2.7	7,360	1.8	4,760	1.4	3,885	1.2	3,535
24.....	2.6	7,030	1.72	4,568	1.45	3,980	1.09	3,360
25.....	2.5	6,705	1.6	4,290	1.45	3,980	1.06	3,315
26.....	2.45	6,545	1.55	4,182	1.5	4,075	1.05	3,300
27.....	2.4	6,385	1.45	3,980	1.5	4,075	0.98	3,196
28.....	2.3	6,080	1.3	3,705	1.55	4,183	0.95	3,153
29.....	2.2	5,800	1.22	3,569	1.3	3,705	0.9	3,080
30.....	2.1	5,530	1.24	3,603	1.25	3,620	0.82	2,968
31.....	2.0	5,265	1.28	3,671	.....	.....	0.8	2,940

MONTHLY DISCHARGE of Bow River near Namaka, for 1910.

MONTH.	DISCHARGE IN SECOND-FEET.			RUN-OFF.
	Maximum.	Minimum.	Mean.	Total in acre-feet.
March 23-31.....	10,195	3,157	6855.2	122,374
April.....	5,475	1,855	2576.3	153,302
May.....	12,875	4,209	7179.3	441,437
June.....	14,670	8,577	10843.4	645,204
July.....	9,930	5,265	7909.5	486,339
August.....	7,360	3,569	5387.7	331,277
September.....	4,290	3,535	3910.0	232,660
October.....	4,182	2,940	3597.8	221,220
The period.....	.....	.....	.....	2,633,813

ELBOW RIVER AT CALGARY.

This station was established May 8th, 1908, by P. M. Sauder. It is located near the old General Hospital in Calgary, in the S.E. $\frac{1}{4}$ Sec. 15, Tp. 24, Rge. 1, W. 5th Mer. There are no tributaries below this station and there is no water diverted from the river except that used by the City of Calgary, whose intake is about eleven miles up-stream.

The stream is confined to one channel. The left bank is high and does not overflow. The right bank is covered with brush and may overflow at extreme flood stage of the stream. The bed of the stream is composed of boulders and gravel and is not liable to change at the station, but may do so further up the stream where there is a small ripple. The channel is straight for about 500 feet below and above the station. The current is slow in low water stages of the stream but fairly swift in the higher stages.

Discharge measurements are made by means of a cable-car, tagged wire, and stay wire. The initial point for soundings is the zero of the tagged wire, at its fastening to the cable support, on the left bank.

The gauge is a plain staff gauge, graduated to feet and hundredths, attached to a twelve inch post sunk in the bed of the stream at the left bank. It is referred to a bench mark on a post on the left bank about 31 feet North of the cable; elevation 15.26, and to a bench mark on the hydrant on the corner of 13th Ave., and 6th St. E.; elevation 19.62. It was read daily during 1910 by Mrs. I. S. White.

DISCHARGE MEASUREMENTS of Elbow River at Calgary, in 1910.

DATE	HYDROGRAPHER.	Width.	Area of section.	Mean velocity.	Gauge height.	Dis-charge.
		<i>Feet.</i>	<i>Sq. ft.</i>	<i>Ft. per sec</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
May 11.....	J. C. Keith.....	135	306.5	1.06	1.04	325.39
May 27.....	do	139	371.05	1.48	1.50	548.04
June 15.....	do	136	350.95	1.28	1.33	450.55
July 11.....	do	135	298.70	0.925	0.965	276.27
Aug. 6.....	do	135	298.75	0.93	0.97	278.74
Aug. 26.....	do	134	284.25	0.825	0.86	234.87
Sept. 19.....	do	140	395.45	1.64	1.655	647.00
Oct. 6.....	H. R. Carscallen.....	106	316.05	1.03	1.06	326.97
Nov. 3.....	do	133	278.20	0.81	0.80	225.58
Nov. 24.....	do	104	255.25	0.385	0.84	98.29*†
Dec. 14.....	do	126	221.70	0.57	1.10	126.43*
Dec. 31.....	do	120	210.95	0.333	1.00	70.32*

* Ice conditions.
† Measurement taken at Bridge 400 yards down stream.

DAILY GAUGE HEIGHT AND DISCHARGE of Elbow River at Calgary, for 1910.

DAY.	April.		May.		June.		July.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec. ft.</i>	<i>Feet</i>	<i>Sec. Feet.</i>	<i>Feet.</i>	<i>Sec. Ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	.00	76	.55	160	1.10	336	1.21	387
2.....	.00	.76	.54	158	1.36	468	1.20	382
3.....	.00	.76	.53	156	1.30	434	1.18	372
4.....	.00	76	.53	156	1.25	407	1.15	358
5.....	.00	76	59	170	1.18	372	1.08	328
6.....	.00	.76	.61	174	1.15	358	1.05	315
7.....	.00	76	.70	196	1.13	349	1.03	307
8.....	.00	76	.82	230	1.35	462	1.02	302
9.....	.00	76	1.15	358	1.32	445	1.00	294
10.....	.00	76	1.17	368	1.35	462	.99	290
11.....	.00	76	1.13	349	1.34	456	.98	286
12.....	.00	76	1.12	345	1.65	650	.94	270
13.....	.00	76	1.07	323	1.55	582	.92	263
14.....	.00	76	1.05	315	1.46	526	.95	274
15.....	.01	77	1.01	298	1.35	462	.99	290
16.....	.09	87	.99	290	1.41	496	.99	290
17.....	.24	108	.98	286	1.57	596	.97	282
18.....	.26	110	.97	282	1.58	602	.97	282
19.....	.30	116	1.03	307	1.46	526	.98	286
20.....	.31	118	1.04	311	1.57	596	.96	278
21.....	.33	121	1.03	307	1.58	602	.93	267
22.....	.34	122	1.01	298	1.56	589	.92	263
23.....	.34	122	1.00	294	1.34	456	.90	256
24.....	.34	122	.99	290	1.28	423	.86	243
25.....	.35	124	1.21	387	1.20	382	.84	237
26.....	.39	130	1.58	602	1.17	368	.83	233
27.....	.43	137	1.54	576	1.23	397	.82	230
28.....	.47	144	1.35	462	1.22	392	.85	240
29.....	.56	162	1.26	412	1.22	392	.79	221
30.....	.57	165	1.15	358	1.22	392	.76	213
31.....			1.12	345			.73	204

DAILY GAUGE HEIGHT AND DISCHARGE of Elbow River at Calgary, for 1910.—Continued.

DAY.	August.		September.		October.		November.		December.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge height.	Dis-charge.
	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.
1.....	.72	202	.90	256	1.16	363	.82	230	1.24	161
2.....	.72	202	.86	243	1.13	349	.81	227	1.19	151
3.....	.71	199	.84	237	1.10	336	.80	224	1.21	154
4.....	.69	194	.89	253	1.12	345	.78	218	1.08	129
5.....	.79	221	.94	270	1.09	332	.76	213	1.06	126
6.....	.76	213	1.06	320	1.07	323	.75	210	1.01	117
7.....	1.01	298	1.22	392	1.03	307	.74	207	1.13	136
8.....	1.16	363	1.18	372	1.04	311	.73	204	1.07	126
9.....	1.13	349	1.12	345	1.04	311	.72	202	1.11	132
10.....	1.15	358	1.06	320	1.06	320	.71	199	1.05	120
11.....	1.26	412	1.15	358	1.05	315	1.07	323	.99	112
12.....	1.24	402	1.20	382	1.05	315	.85	240	1.01	114
13.....	1.18	372	1.25	407	1.04	311	.79	221	.97	107
14.....	1.17	368	1.25	407	1.03	307	.86	243	1.12	130
15.....	1.19	377	1.33	451	1.01	298	.85	240	1.16	134
16.....	1.13	349	1.46	526	.99	290	.84	237	1.32	160
17.....	1.10	336	1.54	576	.97	282	.78	218	1.17	130
18.....	1.05	315	1.65	650	1.01	299	*.75	210	1.14	123
19.....	1.00	294	1.66	657	.97	282	.94	240	1.21	132
20.....	.98	286	1.58	602	.95	274	.94	212	1.23	132
21.....	.95	274	1.54	576	.94	270	1.12	238	1.225	128
22.....	.94	270	1.45	520	.92	263	1.15	212	.90	80
23.....	.93	267	1.43	508	.91	260	1.00	146	.84	72
24.....	.93	267	1.41	496	.89	253	.97	116	1.145	110
25.....	.92	263	1.36	467	.88	250	.79	90	1.195	114
26.....	.87	246	1.31	440	.90	256	1.06	130	1.18	108
27.....	.84	237	1.28	423	.88	250	1.22	157	1.235	115
28.....	.79	221	1.27	418	.87	246	1.26	166	1.095	90
29.....	.85	240	1.24	402	.86	243	1.41	201	1.06	84
30.....	.86	243	1.20	382	.85	240	1.35	188	1.04	80
31.....	.95	274	.....	.....	.84	237	.....	.....	*1.095	82

* Ice conditions from Nov. 18th to Dec. 31st.

MONTHLY DISCHARGE of Elbow River at Calgary, for 1910.

Drainage area, 482 square miles.

MONTH.	DISCHARGE IN SECOND-FEET				RUN-OFF.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on Drainage area.	Total in Acre Feet.
April.....	165	76	101	0.209	0.233	6,009
May.....	602	156	308.5	0.640	0.738	18,970
June.....	650	336	466	0.967	1.08	27,727
July.....	387	204	282	0.585	0.675	17,340
August.....	412	194	287.5	0.596	0.687	17,678
September.....	657	237	421.9	0.875	0.976	25,103
October.....	363	237	291.6	0.605	0.698	17,930
November.....	323	90	205.5	0.426	0.475	12,228
December.....	161	72	119	0.247	0.285	7,317
The period.....						150,302

JUMPINGPOUND CREEK NEAR JUMPING POUND.

This station was established in 1906, by J. F. Hamilton. It is located at a traffic bridge on a road diversion on Sec. 30, Tp. 24, Rge. 4, W. 5th Mer., and about 300 yards from Jumping Pound, P.O.

The channel is straight for about 600 feet below the station. The current is sluggish at and above the station, but breaks into rapids about 150 feet below the station. The right bank is composed of gravel and boulders, covered with clay, and not liable to overflow. The left bank is

similar, but not so high, and liable to overflow in excessive floods. The bed of the stream is composed of coarse gravel and boulders. It is rough and may shift in flood stages. The stream is divided into several channels during its higher stages by a pier and pile bents supporting the bridge.

At low water stage of the stream discharge measurements are made at wading sections, either above or below the bridge. During higher stages of the stream, discharge measurements are made from the down stream side of the bridge. The initial point for soundings is the West side of the right abutment. Distances are marked on the railing of the bridge, at every five feet from the initial point.

The gauge, which is a plain staff, graduated to feet and hundredths is attached vertically to the down-stream face of the first pile bent West of the main truss of the bridge. It is referred to a bench mark on the North end of the cap of the right pile bent; elevation 10.90 above the zero of the gauge.

The gauge was read during 1910 by John Bateman, the postmaster at Jumping Pound.

DISCHARGE MEASUREMENTS of Jumpingpound Creek at Sec. 30, Tp. 24, Rge. 4, W. 5th M., near Jumping Pound.

DATE	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Discharge
1910		<i>Feet.</i>	<i>Sq. ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
May 23.....	J. C. Keith.....	54	32.50	1.11	2.08	36.19†
June 28.....	do	54	166.53	0.16	1.97	26.38†
July 21.....	do	68	148.54	0.05	1.78	7.42
Aug. 16.....	do	77.8	163.67	0.156	1.98	25.53†
Sept. 7.....	do	90	177.03	0.214	2.10	38.02†
Sept. 30.....	H. R. Carscallen.....	101	215.14	0.22	2.12	47.22

† At wading stations near regular station.

DAILY GAUGE HEIGHT AND DISCHARGE of Jumpingpound Creek near Jumping Pound, for 1910.

DAY.	April.		May.		June.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....			2.00	27	1.90	16
2.....			2.00	27	1.90	9
3.....			2.00	27	2.10	40
4.....			2.00	27	2.10	40
5.....			2.00	27	2.00	27
6.....			2.00	27	2.00	27
7.....			2.00	27	2.00	27
8.....			2.00	27	2.00	27
9.....	1.80	9	2.00	27	2.10	40
10.....	1.80	9	2.00	27	2.10	40
11.....	1.80	9	2.00	27	2.10	40
12.....	1.80	9	2.00	27	2.10	40
13.....	1.80	9	2.00	27	2.10	40
14.....	1.80	9	2.00	27	2.10	40
15.....	1.80	9	1.90	16	2.10	40
16.....	1.80	9	1.90	16	2.10	40
17.....	1.80	9	1.90	16	2.20	57
18.....	1.80	9	1.90	16	2.20	57
19.....	1.90	16	2.00	27	2.20	57
20.....	1.90	16	2.00	27	2.30	76
21.....	1.90	16	2.00	27	2.30	76
22.....	1.90	16	2.00	27	2.30	76
23.....	1.90	16	1.90	16	2.30	76
24.....	1.90	16	1.90	16	2.20	57
25.....	1.90	16	1.90	16	2.10	40
26.....	1.90	16	1.90	16	2.00	27
27.....	1.90	16	1.90	16	2.00	27
28.....	1.90	16	1.90	16	2.00	27
29.....	1.90	16	1.90	16	1.90	16
30.....	1.90	16	1.90	16	1.90	16
31.....			1.90	16		

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DAILY GAUGE HEIGHT AND DISCHARGE of Jumpingpound Creek near Jumping Pound, for 1910.
Continued.

DAY.	July.		August.		September.		October.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.
1.....	1.90	16	1.60	3.5	1.80	9	2.10	40
2.....	1.80	9	1.60	3.5	1.80	9	2.10	40
3.....	1.80	9	1.60	3.5	1.80	9	2.10	40
4.....	1.80	9	1.60	3.5	1.80	9	2.10	40
5.....	1.80	9	1.70	5	1.90	16	2.10	40
6.....	1.80	9	1.80	9	1.95	21	2.10	40
7.....	1.80	9	1.90	16	2.12	43	2.00	27
8.....	1.80	9	1.70	5	2.20	57	2.00	27
9.....	1.80	9	1.70	5	2.20	57	2.00	27
10.....	1.80	9	1.70	5	2.20	57	1.90	16
11.....	1.80	9	1.70	5	2.20	57	1.90	16
12.....	1.80	9	1.80	9	2.20	57	1.90	16
13.....	1.80	9	1.90	16	2.20	57	1.90	16
14.....	1.70	5	2.00	27	2.30	76	1.80	9
15.....	1.70	5	2.00	27	2.30	76	1.80	9
16.....	1.70	5	2.00	27	2.30	76	1.80	9
17.....	1.70	5	1.90	16	2.40	96	1.80	9
18.....	1.70	5	1.70	5	2.40	96	1.80	9
19.....	1.70	5	1.70	5	2.50	117	1.80	9
20.....	1.70	5	1.70	5	2.50	117	1.80	9
21.....	1.70	5	1.70	5	2.50	117	1.80	9
22.....	1.70	5	1.70	5	2.50	117	1.80	9
23.....	1.70	5	1.80	9	2.40	96	1.70	5
24.....	1.70	5	1.80	9	2.40	96	1.70	5
25.....	1.60	3.5	1.70	5	2.30	76	1.70	5
26.....	1.60	3.5	1.70	5	2.30	76	1.70	5
27.....	1.60	3.5	1.70	5	2.30	76	1.70	5
28.....	1.60	3.5	1.70	5	2.20	57	1.70	5
29.....	1.60	3.5	1.80	9	2.20	57	1.70	5
30.....	1.60	3.5	1.80	9	2.10	40	1.70	5
31.....	1.60	3.5	1.80	9	.....	.....	1.70	5

MONTHLY DISCHARGE of Jumpingpound Creek near Jumping Pound, for 1910.

Drainage area, 187 square miles.

MONTH.	DISCHARGE IN SECOND-FEET.				RUN-OFF.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on Drainage area.	Total in acre-feet.
April (9-30).....	16	9	12.8	.063	.052	560
May.....	27	16	22.4	.119	.137	1,377
June.....	76	9	40.6	.216	.241	2,416
July.....	16	3.5	6.56	.035	.040	403
August.....	27	3.5	8.9	.042	.048	547
September.....	117	9	64.0	.342	.382	3,808
October.....	40	5	16.5	.088	.101	1,014
The period.....						10,125

SPRAY RIVER NEAR BANFF.

This station was established July 15th, 1910, by J. C. Keith. It is located at a traffic bridge about one mile South-East of the Village of Banff, on the N.W. $\frac{1}{4}$ Sec. 25, Tp. 25, Rge. 12, W. 5th Mer., and about 100 yards above the junction with Bow River.

Discharge measurements are made from the down-stream side of the bridge. The initial point for soundings is the extreme West end of the bottom chord of the bridge.

The channel is straight for 50 feet above and 250 feet below the station. The right bank is low and may overflow at high stages of the stream. The left bank is steep and high. The bed is composed of coarse gravel and is not liable to shift. The current is swift but the surface is free from ripples at the station. A quantity of rock has been dumped into the channel at the left abutment of the bridge and affects the accuracy of the results.

The gauge is a plain staff, graduated to feet and hundredths, nailed to the down-stream end of the abutment. It is referred to bench marks as follows:—(1) Top of bolt near the West end of the guard rail on the North side of the bridge; elevation 13.27. (2) Top of bolt near the centre of the guard rail on the North side of the bridge; elevation 13.42.

The gauge is read by N. B. Sanson, Meteorological Observer, at Banff.

DISCHARGE MEASUREMENTS of Spray River near Banff, in 1910.

Date.		Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Dis-charge.
1910			<i>Feet.</i>	<i>Sq. ft.</i>	<i>Ft. per.sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
July	15.....	J. C. Keith.....	108.5	233.82	6.22	1.95	1,452.45
Aug.	10.....	do	82.5	181.87	5.245	1.45	952.00
Aug.	31.....	do	77.5	127.23	3.85	.86	490.03
Sept.	22.....	do	74.5	134.52	4.14	.95	557.16
Oct.	19.....	H. R. Carscallen.....	73.0	120.69	3.77	.83	454.59
Nov.	5.....	do	72.5	100.10	3.12	.54	312.81
Dec.	2.....	do	57.0	178.35	1.960	.63	231.93
Dec.	24.....	do	52.0	91.35	2.43	.59	221.69

DAILY GAUGE HEIGHT AND DISCHARGE of Spray River, near Banff, for 1910.

DAY.	July.		August.		September.		October.		November.		December.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....			1.35	862	.85	480	.80	450				
2.....			1.30	820	.85	480	.80	450				
3.....			1.25	777	.80	450	.80	450				
4.....			1.35	862	.80	450	.80	450			1.92	3.50
5.....			1.35	862	.80	450	.75	422				
6.....			1.45	950	.90	510	.75	422			1.99	390
7.....			1.55	1,042	.90	510	.85	480			1.98	380
8.....			1.45	950	.85	480	.85	480			1.72	260
9.....			1.45	950	.85	480	.80	450			1.66	235
10.....			1.45	950	.85	480	.90	510			1.66	235
11.....			1.50	995	.80	450	.95	545			1.62	220
12.....			1.45	950	.80	450	.90	510			1.71	255
13.....			1.45	950	.80	450	.90	510			1.56	200
14.....			1.40	905	.80	450	.85	480			1.47	170
15.....	1.95	1,455	1.40	905	.80	450	.85	480			1.52	185
16.....	1.95	1,455	1.35	862	.85	480	.85	480			1.52	185
17.....	1.95	1,455	1.30	820	.85	480	.85	480			1.51	180
18.....	2.00	1,510	1.25	777	.90	510	.85	480			1.54	190
19.....	1.80	1,290	1.25	777	.90	510	.85	480			1.38	150
20.....	1.75	1,240	1.25	777	.95	545	.85	480			1.49	175
21.....	1.75	1,240	1.20	735	.95	545	.80	450			1.52	185
22.....	1.75	1,240	1.20	735	.95	545	.75	422			1.44	165
23.....	1.70	1,190	1.15	695	.95	545	.75	422			1.67	240
24.....	1.60	1,090	1.20	735	.95	545	.70	395			1.62	220
25.....	1.50	995	1.05	617	.95	545	.75	422			1.77	280
26.....	1.50	995	.95	545	.90	510	.70	395			1.75	275
27.....	1.45	950	.95	545	.85	480	.60	345			1.72	260
28.....	1.40	905	.90	510	.85	480	.60	345			1.80	290
29.....	1.35	862	.90	510	.85	480	.60	345			1.76	275
30.....	1.35	862	.85	480	.85	480	.60	345			1.58	210
31.....	1.35	862	.80	450			.60	345			1.64	230

No observations taken for November.
Ice conditions during December.
Auxiliary Gauge used during month of December.

MONTHLY DISCHARGE of Spray River, near Banff, for 1910.

Drainage area, 310 square miles.

MONTH.	DISCHARGE IN SECOND-FEET.			RUN-OFF.		
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on Drainage area.	Total in acre-feet.
July (15-31).....	1,510	862	1,153	3.72	2.35	38,876
August.....	1,042	450	784	2.53	2.92	48,198
September.....	545	450	490	1.58	1.76	29,157
October.....	545	345	443	1.43	1.65	27,213
November†.....						
December (4-31).....	390	150	237	.764	.767	12,486
The period.....						155,930

† No observations taken for November.

DEVILS CREEK NEAR BANKHEAD.

This gauging station, located on the S.E. ¼ Sec. 28, Tp. 26, Rge. 11, W. 5th Mer., and within 300 yards of Lake Minnewanka Chalet, was established June 18th, 1910, by J. C. Keith. It is about 8 miles North and East of Banff.

The gauge is a plain staff, graduated to feet and hundredths, placed at the right bank. It is referred to two bench marks, (1) The top of a blazed tree stump five feet North of the gauge; elevation 4.76. (2) The top of a blazed tree stump 75 feet East of the gauge; elevation 5.27.

The channel is straight for about 100 feet above and 300 feet below the station. Both banks are low, swampy and covered with timber and brush. The stream bed is of soft mud and very uneven. Several hundred yards down-stream is an old dam which raises the water-level about three feet above normal. Consequently the water at the station is deep and sluggish, being apparently dead at ordinary stages of the creek. On this account all discharge measurements are made at the traffic bridge, close to the mouth of the creek on the trail from Banff. The creek here flows in a narrow channel over a rough rocky bed and between high rocky banks. The initial point for soundings is painted on the down-stream guard rail in line with the inner face of the left abutment.

The gauge was read daily by Commander Way, R.N., proprietor of the Lake Minnewanka Chalet.

DISCHARGE MEASUREMENTS of Devils Creek, near Bankhead, in 1910.

Date.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Discharge.
1910		<i>Feet.</i>	<i>Sq.-ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
June 4.....	J. C. Keith.....	23	35.25	3.65	.....	128.65
" 18.....	do.....	25	44.10	4.25	1.96	187.23
July 18.....	do.....	24	33.26	3.43	1.73	113.96
Aug. 10.....	do.....	25	41.16	3.93	1.86	161.92
Sept. 1.....	do.....	24	29.30	2.77	1.58	84.89
Sept. 23.....	do.....	24	31.60	3.034	1.63	95.90
Oct. 18.....	H. R. Carscallen.....	24	30.75	2.78	1.52	85.54
Nov. 7.....	do.....	24	26.92	2.579	1.42	69.53
Dec. 3.....	do.....	24	25.80	2.403	1.34	61.99
" 28.....	do.....	24	27.12	2.179	1.16	59.10

DAILY GAUGE HEIGHT AND DISCHARGE of Devils Creek, near Bankhead, for 1910.

DAY.	June.		July.		August.		September.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.
1.....			1.90	163	1.57	87.3	1.58	88.7
2.....			1.89	160	1.57	87.3	1.56	85.9
3.....			1.84	143	1.57	87.3	1.56	85.9
4.....			1.85	146	1.56	85.9	1.56	85.9
5.....			1.85	146	1.65	99.5	1.59	90.1
6.....			1.80	131	1.81	134	1.60	91.5
7.....			1.78	126	1.86	149	1.60	91.5
8.....			1.78	126	1.86	149	1.62	94.7
9.....			1.78	126	1.87	153	1.60	91.5
10.....			1.78	126	1.86	149	1.58	88.7
11.....			1.76	121	1.85	146	1.59	90.1
12.....			1.76	121	1.84	143	1.58	88.7
13.....			1.75	118.5	1.81	134	1.58	88.7
14.....			1.74	116.4	1.81	134	1.57	87.3
15.....			1.72	112.2	1.80	131	1.57	87.3
16.....			1.72	112.2	1.81	134	1.56	85.9
17.....			1.72	112.2	1.81	134	1.56	85.9
18.....			1.70	108	1.76	121	1.59	90.1
19.....	1.95	183	1.69	106.3	1.73	114.3	1.62	94.7
20.....	2.00	204	1.69	106.3	1.71	110.1	1.64	97.9
21.....	2.02	213	1.68	104.6	1.69	106.3	1.64	97.9
22.....	2.00	204	1.65	99.5	1.66	101.2	1.64	97.9
23.....	1.97	191	1.64	97.9	1.68	104.6	1.64	97.9
24.....	1.96	187	1.62	94.7	1.65	99.5	1.64	97.9
25.....	1.96	187	1.59	90.1	1.64	97.9	1.62	94.7
26.....	1.94	179	1.59	90.1	1.62	94.7	1.60	91.5
27.....	1.95	183	1.59	90.1	1.60	91.5	1.60	91.5
28.....	1.95	183	1.59	90.1	1.58	88.7	1.63	96.3
29.....	1.94	179	1.59	90.1	1.58	88.7	1.58	88.7
30.....	1.92	171	1.59	90.1	1.60	91.5	1.55	84.5
31.....			1.59	90.1	1.60	91.5		

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DAILY GAUGE HEIGHT AND DISCHARGE of Devils Creek, near Bankhead, for 1910.—Continued.

DAY.	October.		November.		December.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.
1.....	1.58	88.7	1.39	66.5	1.28	56.4
2.....	1.57	87.3	1.36	63.5	1.32	59.8
3.....	1.56	85.9	1.38	65.5	1.30	58
4.....	1.56	85.9	1.39	66.5	1.25	54
5.....	1.52	80.9	1.36	63.5	1.24	53
6.....	1.53	82.1	1.40	67.5	1.25	54
7.....	1.57	87.3	1.40	67.5	1.24	53
8.....	1.53	82.1	1.38	65.5	1.20	50
9.....	1.55	84.5	1.38	65.5	1.33	60.7
10.....	1.56	85.9	1.37	64.5	1.25	54
11.....	1.56	85.9	1.37	64.5	1.19	49
12.....	1.53	82.1	1.38	65.5	1.15	46
13.....	1.51	79.7	1.36	63.5	1.12	44
14.....	1.47	74.9	1.37	64.5	1.20	50
15.....	1.48	76.1	1.37	64.5	1.25	54
16.....	1.48	76.1	1.37	64.5	1.18	49
17.....	1.49	77.3	1.36	63.5	1.20	51
18.....	1.51	79.7	1.36	63.5	1.20	52
19.....	1.48	76.1	1.36	63.5	1.18	51
20.....	1.46	73.7	1.33	60.7	1.20	54
21.....	1.45	72.5	1.37	64.5	1.16	52
22.....	1.45	72.5	1.37	64.5	1.15	52
23.....	1.42	69.5	1.35	62.5	1.14	52
24.....	1.41	68.5	1.36	63.5	1.18	58
25.....	1.46	73.7	1.35	62.5	1.18	59
26.....	1.42	69.5	1.35	62.5	1.20	61
27.....	1.41	68.5	1.33	60.7	1.13	56
28.....	1.38	65.5	1.30	58.0	1.11	55
29.....	1.37	64.5	1.30	58.0	1.12	56
30.....	1.39	66.5	1.30	58.0	1.11	55
31.....	1.37	64.5	.....	.....	1.10	54

Ice conditions from Dec. 16th to Dec. 31st.

MONTHLY DISCHARGE OF Devils Creek, near Bankhead, for 1910.

Drainage area, 58 square miles.

MONTH.	DISCHARGE IN SECOND-FEET.				RUN-OFF.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on Drainage area.	Total in acre-feet.
June (19-30).....	213	171	188.7	3.26	1.45	4,490
July.....	163	90.1	114.7	1.98	2.28	7,052
August.....	153	87.3	114.1	1.96	2.26	7,017
September.....	97.9	84.5	90.66	1.56	1.74	5,394
October.....	88.7	64.5	77.03	1.33	1.53	4,736
November.....	67.5	58.0	63.63	1.09	1.22	3,786
December.....	61	44.	53.64	.925	1.06	3,298
The period.....						35,773

FISH CREEK NEAR PRIDDIS.

This station was established May 13th, 1907, by P. M. Sauder. It is on the S. W. $\frac{1}{4}$ Sec. 26, Tp. 22, Rge. 3, W. 5th Mer., about one mile from Priddis, and near Mr. Percival's buildings. A plain staff gauge, graduated to feet and hundredths, is placed vertically at the left bank, about 200 yards North of Mr. Percival's house. Bench Mark No. 1 is a block of wood fastened on the North-East corner of frame stable near the road; elevation 9.26. Bench Mark No. 2 is two spikes driven about two feet from the ground, in a telephone post 259 feet West of the gauge; elevation 8.65 above the zero of the gauge.

The channel is straight for 100 feet above and 200 feet below the station. The left bank is high, and will not overflow. The right bank is low, covered with brush and timber, and is liable to overflow at extreme high water. The bed is composed of gravel, but not liable to shift. The current is sluggish at extreme low stages of the stream.

Measurements are made by wading at or near the gauge, during low water stages of the stream, and high water stages are computed from slope measurements by the use of Kutter's formula. It is proposed to establish a cable station at this point for high water measurements.

The gauge was read by George Percival from May 1st to Sept. 22nd, and by Fred. Percival for the remainder of 1910.

DISCHARGE MEASUREMENTS of Fish Creek, near Priddis, in 1910.

DATE.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Discharge.
		<i>Feet.</i>	<i>Sq.-ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
April 27.....	J. S. Tempest.....					7.8
May 14.....	J. C. Kelth.....	12	7.55	1.68	0.99	12.66
June 5.....	do.....	12	8.32	1.67	1.05	13.92
July 4.....	do.....	25.5	14.25	0.114	0.54	1.64
Aug. 4.....	do.....					Nil.
Aug. 19.....	do.....	27.0	17.22	1.36	0.65	2.34
Sept. 12.....	do.....	37.5	41.58	0.747	1.37	30.99
Oct. 7.....	H. R. Carscallen.....	31.5	27.86	0.306	0.91	8.52
Nov. 10.....	do.....	17.0	8.73	0.39	0.81	3.42

† These measurements were taken at wading stations, near the regular station.

DAILY GAUGE HEIGHT AND DISCHARGE of Fish Creek, near Priddis, for 1910.

DAY.	May.		June.		July.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	.8	5.5	.8	5.5	.6	1.9
2.....	.8	5.5	.9	8.2	.6	1.9
3.....	.8	5.5	1.0	11.5	.6	1.9
4.....	.8	5.5	1.1	15.5	.5	1.0
5.....	.9	8.2	1.1	15.5	.5	1.0
6.....	.9	8.2	1.1	15.5	.5	1.0
7.....	.9	8.2	1.0	11.5	.5	1.0
8.....	.9	8.2	.9	8.2	.5	1.0
9.....	.9	8.2	.9	8.2	.5	1.0
10.....	.9	8.2	.9	8.2	.5	1.0
11.....	1.0	11.5	.9	8.2	.4	.3
12.....	1.0	11.5	.9	8.2	.4	.3
13.....	1.0	11.5	.9	8.2	.4	.3
14.....	1.0	11.5	.8	5.5	.4	.3
15.....	.9	8.2	.7	3.4	.3	.0
16.....	.9	8.2	.7	3.4	.5	1.0
17.....	.9	8.2	.8	5.5	.3	.0
18.....	.9	8.2	.8	5.5		.0
19.....	.9	8.2	.8	5.5		.0
20.....	.9	8.2	.8	5.5		.0
21.....	.9	8.2	.9	8.2		.0
22.....	.9	8.2	.9	8.2		.0
23.....	.9	8.2	.9	8.2		.0
24.....	.9	8.2	.8	5.5		.0
25.....	.9	8.2	.8	5.5		.0
26.....	.85	6.8	.8	5.5		.0
27.....	.85	6.8	.7	3.4		.0
28.....	.8	5.5	.6	1.9		.0
29.....	.8	5.5	.6	1.9		.0
30.....	.8	5.5	.6	1.9		.0
31.....	.8	5.5				.0

DAILY GAUGE HEIGHT AND DISCHARGE of Fish Creek, near Priddis, for 1910.—Continued.

DAY.	August.		September.		October.	
	Gauge Height	Dis-charge.	Gauge Height	Dis-charge.	Gauge Height	Dis-charge.
	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.
1.....		.0	.9	8.2	.8	5.5
2.....		.0	.9	8.2	.8	5.5
3.....		.0	.9	8.2	.8	5.5
4.....		.0	.9	8.2	.8	5.5
5.....		.0	.8	5.5	.8	5.5
6.....		.0	.9	8.2	.8	5.5
7.....	.5	1.0	1.4	35.7	.91	8.5
8.....	.5	1.0	1.5	44.8	.91	8.5
9.....	.5	1.0	1.4	35.7	.97	10.5
10.....	.5	1.0	1.3	27.6	.88	7.6
11.....	.5	1.0	1.4	35.7	.88	7.6
12.....	.5	1.0	1.4	35.7	.86	7.1
13.....	.5	1.0	1.3	27.6	.86	7.1
14.....	.4	.3	1.2	20.8	.85	6.8
15.....	.7	3.4	1.2	20.8	.84	6.5
16.....	.7	3.4	1.2	20.8	.85	6.8
17.....	.7	3.4	1.1	15.5	.86	7.1
18.....*	.7	3.4	1.1	15.5	.86	7.1
19.....	.7	3.4	1.0	11.5	.85	6.8
20.....	.6	1.9	.9	8.2	.86	7.1
21.....	.5	1.0	1.0	11.5	.86	7.1
22.....	.5	1.0	1.0	11.5	.86	7.1
23.....	.5	1.0	1.0	11.5	.86	7.1
24.....	.5	1.0	1.0	11.5	.86	7.1
25.....	.5	1.0	1.0	11.5	.86	7.1
26.....	.5	1.0	1.0	11.5	.83	6.3
27.....	.5	1.0	1.0	11.5	.83	6.3
28.....	.5	1.0	1.0	11.5	.83	6.3
29.....	.7	3.4	1.0	11.5	.83	6.3
30.....	.7	3.4	.8	5.5	.83	6.3
31.....	.8	5.5	.....	.....	.83	6.3

* Creek dry from July 18th to Aug. 6th.

MONTHLY DISCHARGE of Fish Creek, near Priddis, for 1910.
Drainage area, 109 square miles.

MONTH.	DISCHARGE IN SECOND FEET.			RUN-OFF.		
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches in Drainage area.	Total in acre-feet.
May.....	11.5	5.5	7.8	0.071	0.082	480
June.....	15.5	1.9	7.23	0.066	0.074	430
July.....	1.9	.0	.48	0.004	0.0046	30
August.....	5.5	.0	1.5	0.014	0.016	92
September.....	44.8	5.5	17.0	0.156	0.174	1,011
October.....	10.5	5.5	6.8	0.062	0.071	418
The period.....						2,461

NORTH BRANCH OF SHEEP RIVER AT MILLARVILLE.

This station was established May 22nd, 1908, by P. M. Sauder. The gauge which is a plain staff, graduated to feet and hundredths, is fastened to the East end of a crib work about 100 yards from Malcolm T. Millar's house on the S. W. $\frac{1}{4}$ Sec. 12, Tp. 21, Rge. 3, W. 5th Mer. It is referred to a bench mark on the South-West corner of Mr. Millar's house elevation 13.89 above the zero of the gauge. Discharge measurements are made at a wading section 50 yards down-stream from the gauge at low water. During high water and flood stages of the stream, discharge measurements are made from a steel highway bridge about one mile below the gauge, on the road allowance East of Section 12. The initial point for soundings is the outer edge of the bed plate on the down-stream side of the North end of the bridge. Distances from the initial point are marked at every five feet, on the bottom chord.

The stream is subject to sudden rises and at high stages the current is swift. During these periods the channel which is composed of gravel is liable to shift.
The gauge was read once each day by Malcolm T. Millar.

DISCHARGE MEASUREMENTS of North Branch of Sheep River at Millarville, in 1910.

Date.		Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Discharge.
			<i>Feet.</i>	<i>Sq. ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
May	16.....	J. C. Keith.....	21.5	18.51	1.46	1.9	26.96†
July	5.....	do	18	8.7	0.397	1.5	3.45†
Aug.	3.....	do	9	2.27	0.577	1.45	1.31
Aug.	20.....	do	9	1.99	0.66	1.49	1.32
Sept.	13.....	do	26.7	20.09	1.56	1.90	31.4 †
Oct.	7.....	H. R. Carscallen.....	27.3	21.17	1.085	1.84	22.98†
Nov.	10.....	do	20.0	11.98	0.388	1.55	4.65†

† These measurements taken at wading stations near regular station.

SOUTH BRANCH OF SHEEP RIVER NEAR BLACK DIAMOND.

This station was established May 23rd, 1908, by P. M. Sauder. It is located at the steel highway bridge on the road allowance between Secs. 8 and 17, Tp. 20, Rge. 2, W. 5th Mer. It is one-half mile from Black Diamond P.O.

The gauge which is of the standard chain type, is fastened to the floor of the bridge on the down-stream side, about midway between the west abutment and the centre pier. Bench mark No. 1, is two nail heads on the North face of the West abutment; elevation 9.37 above the zero of the gauge. Bench mark, No. 2, is a block of wood nailed to the North face of the centre pier; elevation 7.67. The chain used at first, was not satisfactory and was replaced by a chain of better quality on July 13th, 1909. Since then the results have been more satisfactory.

The channel is straight for about 300 feet above the station, then swings sharply to the left. It is straight for about 200 feet below the station, then turns gradually to the right. Both banks are composed of gravel. The right bank is low, partly covered with brush, and overflows in higher stages of the stream. The left bank is high and cannot overflow. The bed is composed of coarse gravel, is permanent at low water stage of the stream, but a gravel bar at the right bank, which is covered during high water stages is liable to shift. The river has considerable fall and the current is swift.

Discharge measurements are made from the down-stream side of the bridge. The initial point for soundings is the outer edge of the bed plate on the West end of the bridge. Distances from the initial point are marked every five feet, on the bottom chord of the bridge.

The gauge was read once each day by Herbert Arnold, merchant at Black Diamond.

DISCHARGE MEASUREMENTS of S. Branch Sheep River, near Black Diamond, in 1910.

Date.		Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Discharge.
			<i>Feet.</i>	<i>Sq. ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1910							
May	12.....	J. S. Tempest.....					163.329
May	16.....	J. C. Keith.....	76	94.45	1.78	0.84	167.11
June	7.....	do	77.5	125.45	2.685	1.31	336.94
July	5.....	do	75	89.85	1.85	0.88	166.54
Aug.	3.....	do	65	64.20	1.20	0.50	76.92
Aug.	20.....	do	74	85.84	1.65	0.80	141.87
Sept.	13.....	do	76.5	94.72	1.87	0.91	177.47
Oct.	8.....	H. R. Carscallen.....	74.0	93.58	1.62	0.83	151.88
Nov.	11.....	do	62.0	66.00	1.106	0.52	73.01

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DAILY GAUGE HEIGHT AND DISCHARGE of S. Branch Sheep River, near Black Diamond, for 1910.

DAY.	June.		July.		August.		September.		October.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.
1.....	1.1	248	1.0	209	.5	72	.7	115	1.0	209
2.....	1.2	289	1.0	209	.5	72	.7	115	.9	174
3.....	1.1	248	.9	174	.5	72	.7	115	.9	174
4.....	1.0	209	.9	174	.5	72	.7	115	.9	174
5.....	1.1	248	.9	174	.6	91	.7	115	.8	142
6.....	1.2	289	.9	174	.7	115	1.0	209	.8	142
7.....	1.3	333	.9	174	.9	174	1.0	209	.8	142
8.....	1.2	289	.9	174	.8	142	.9	174	.83	152
9.....	1.2	289	.8	142	.8	142	.9	174	.9	174
10.....	1.2	289	.8	142	.8	142	1.0	209	.9	174
11.....	1.4	380	.8	142	.8	142	1.0	209	.88	168
12.....	1.5	428	.8	142	.7	115	1.0	209	.88	168
13.....	1.3	333	.8	142	.8	142	1.0	209	.83	152
14.....	1.2	289	.8	142	.9	174	1.0	209	.81	145
15.....	1.2	289	.8	142	.9	174	1.1	248	.80	142
16.....	1.2	289	.8	142	.9	174	1.2	289	.80	142
17.....	1.4	380	.9	174	.9	174	1.4	380	.80	142
18.....	1.3	333	.9	174	.9	174	1.5	428	.80	142
19.....	1.1	248	.8	142	.9	174	1.4	380	.85	158
20.....	1.2	289	.7	115	.9	174	1.2	289	.72	120
21.....	1.3	333	.7	115	.8	142	1.2	289	.72	120
22.....	1.1	248	.7	115	.7	115	1.2	289	.70	115
23.....	1.1	248	.7	115	.7	115	1.2	289	.68	110
24.....	1.1	248	.7	115	.7	115	1.2	289	.65	102
25.....	1.0	209	.6	91	.7	115	1.0	209	.70	115
26.....	1.0	209	.6	91	.7	115	1.1	248	.60	91
27.....	1.2	289	.6	91	.7	115	1.0	209	.50	72
28.....	1.1	248	.6	91	.6	91	1.0	209	.55	81
29.....	1.0	209	.6	91	.6	91	1.0	209	.60	91
30.....	1.0	209	.6	91	.6	91	1.0	209	.57	85
31.....			.6	91	.7	115	.....	.....	.55	81

MONTHLY DISCHARGE of S. Branch Sheep River, near Black Diamond, for 1910.

Drainage area, 241 square miles.

MONTH.	DISCHARGE IN SECOND-FEET.				RUN-OFF.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in Inches on Drainage area.	Total in acre-feet.
June.....	428	209	278	1.15	1.28	16,542
July.....	209	91	139	.576	.664	8,529
August.....	174	72	127	.526	.606	7,797
September.....	428	115	228	.947	1.057	13,585
October.....	209	72	136	.562	.648	8,330
The period.....						54,783

SHEEP RIVER NEAR OKOTOKS.

This station was established by J. F. Hamilton in 1906. It is located at the Canadian Pacific Railway Bridge, about one mile from Okotoks, on the West boundary of Sec. 22, Tp. 20, Rge. 29, W. 4th Mer.

A plain staff graduated to feet and tenths, was at first attached to the North face of the North pier. Later, owing to the shifting of the main channel of the stream to the right, another gauge, graduated to feet and hundredths, was attached to the North face of the South pier. Both these gauges were referred to a bench mark on the top of the down-stream end of the North pier; elevation 11.48. The railway have rebuilt this bridge and when building the centre pier during the winter of 1910, imbedded a plain staff, graduated to feet and tenths, in the North face. The datum of the new gauge is 0.85 feet above that of the old gauge.

The new gauge was used during 1910, and was read by Miss Henderson, who lives about a quarter of a mile from the bridge.

The channel is straight for about 700 feet above and 300 feet below the station. The current is swift and the bed which is composed of coarse gravel, shifts considerably. Short piles, the remains of an old pier, a few feet upstream from the station, affect the accuracy of discharge measurements. The right bank is low and composed of gravel. It overflows at high stages and shifts. The left bank is low and composed of gravel and sand. It also overflows at high water and shifts.

Discharge Measurements were made from the downstream side of the bridge. The initial point for soundings is 155 feet from the north end of the trestle approach to the bridge. Distances from the initial point are marked at intervals of five feet along the downstream side of the bridge.

Sheep River falls rapidly. The banks and bed of the stream are composed of gravel and clay. The current is swift and during high water the channel shifts almost continuously. It is impossible to locate a suitable gauging station for high water stages and the daily discharges at these stages are approximate. During low water stage the channel seldom shifts and the results are fairly good. During the latter period, discharge measurements are made at a wading section about 200 yards downstream from the bridge.

DISCHARGE MEASUREMENTS of Sheep River near Okotoks, for 1910.

Date.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Discharge.
		<i>Feet.</i>	<i>Sq.-ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
May 17.....	J. C. Keith.....	57.5	80.69	2.51	1.8	203.22
July 6.....	do	54.5	69.39	2.33	1.55	162.01
Aug. 2.....	do	50	48.90	1.58	1.07	77.41
Aug. 22.....	do	53	58.87	2.06	1.40	121.26
Sept. 14.....	do	56.5	76.40	2.66	1.80	203.09
Oct. 8.....	H. R. Carscallen.....	55.5	78.35	2.52	0.70	197.53*
Nov. 11.....	do	51.7	64.33	1.93	0.40	124.00

* This measurement was taken at wading station near regular station.

DAILY GAUGE HEIGHT AND DISCHARGE of Sheep River, near Okotoks, for 1910.

DAY.	April.		May.		June.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Gauge	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	1.1	80	1.7	180	1.9	228
2.....	.9	59	1.7	180	1.9	228
3.....	.9	59	1.8	203	2.0	255
4.....	.9	59	1.9	228	2.0	255
5.....	1.0	69	2.0	255	1.8	203
6.....	1.0	69	2.0	255	2.0	255
7.....	1.1	80	2.1	284	2.1	284
8.....	1.1	80	2.3	345	2.0	255
9.....	1.1	80	2.1	284	2.0	255
10.....	1.2	93	2.0	255	2.0	255
11.....	1.2	93	1.9	228	2.1	284
12.....	1.2	93	1.8	203	2.3	345
13.....	1.2	93	1.8	203	2.1	284
14.....	1.2	93	1.8	203	2.0	255
15.....	1.2	93	1.8	203	1.9	228
16.....	1.2	93	1.8	203	2.0	255
17.....	1.3	107	1.8	203	2.1	284
18.....	1.3	107	1.85	215	2.2	314
19.....	1.5	140	2.0	255	2.2	314
20.....	1.6	159	2.0	255	2.2	314
21.....	1.5	140	1.9	228	2.1	284
22.....	1.4	123	1.9	228	2.0	255
23.....	1.3	107	2.1	284	1.9	228
24.....	1.3	107	2.2	314	1.9	228
25.....	1.5	140	2.3	345	1.7	180
26.....	1.7	180	2.5	408	1.7	180
27.....	1.8	203	2.3	345	1.8	203
28.....	1.8	203	2.1	284	1.8	203
29.....	1.7	180	2.0	255	1.8	203
30.....	1.7	180	1.9	228	1.8	203
31.....			1.9	228		

DAILY GAUGE HEIGHT AND DISCHARGE of Sheep River, near Okotoks, for 1910.—Continued.

DAY.	July		August.		September.		October.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.
1.....	1.7	180	1.1	80	1.3	107	1.8	203
2.....	1.7	180	1.0	69	1.3	107	1.8	203
3.....	1.7	180	1.0	69	1.3	107	1.8	203
4.....	1.6	159	1.0	69	1.3	107	1.8	203
5.....	1.5	140	1.0	69	1.5	140	1.7	180
6.....	1.5	140	1.0	69	1.8	203	1.7	180
7.....	1.5	140	1.45	132	1.9	228	1.7	180
8.....	1.5	140	1.4	123	1.8	203	1.7	180
9.....	1.4	123	1.4	123	1.7	180	1.6	159
10.....	1.4	123	1.45	132	1.7	180	1.6	159
11.....	1.4	123	1.4	123	1.8	203	1.6	159
12.....	1.4	123	1.4	123	1.7	180	1.6	159
13.....	1.4	123	1.4	123	1.7	180	1.6	159
14.....	1.4	123	1.4	123	1.8	203	1.6	159
15.....	1.4	123	1.5	140	1.9	228	1.6	159
16.....	1.4	123	1.6	159	2.0	255	1.6	159
17.....	1.4	123	1.6	159	2.0	255	1.55	150
18.....	1.4	123	1.6	159	2.0	255	1.5	140
19.....	1.4	123	1.6	159	2.0	255	1.5	140
20.....	1.35	115	1.5	140	2.0	255	1.5	140
21.....	1.35	115	1.5	140	2.0	255	1.5	140
22.....	1.3	107	1.4	123	2.0	255	1.5	140
23.....	1.2	93	1.4	123	2.0	255	1.5	140
24.....	1.2	93	1.4	123	2.0	255	1.5	140
25.....	1.1	80	1.3	107	2.0	255	1.5	140
26.....	1.1	80	1.3	107	2.0	255	1.45	132
27.....	1.1	80	1.3	107	1.95	242	1.4	123
28.....	1.1	80	1.2	93	1.9	228	1.4	123
29.....	1.1	80	1.2	93	1.9	228	1.4	123
30.....	1.1	80	1.2	93	1.9	228	1.4	123
31.....	1.1	80	1.3	107	.....	.....	1.4	123

MONTHLY DISCHARGE of Sheep River near Okotoks, for 1910.

Draingage area, 624 square miles.

MONTH.	DISCHARGE IN SECOND-FEET.				RUN-OFF.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches in Drainage area.	Total in Acre-feet.
April.....	203	59	112	0.180	0.201	6,668
May.....	408	180	251	0.403	0.464	15,445
June.....	314	180	251	0.402	0.448	14,910
July.....	180	80	119	0.191	0.220	7,329
August.....	159	69	115	0.184	0.212	7,059
September.....	255	107	210	0.336	0.375	12,470
October.....	203	123	156	0.249	0.287	9,562
The period.....	.....	.....	.....	.....	.....	73,443

HIGHWOOD RIVER AT HIGH RIVER.

This station was first established some years ago, by the Irrigation Surveys. It was re-established May 28, 1908, by P. M. Sauder. It is located at the highway bridge in the town of High River, on the N.W. $\frac{1}{4}$ Sec. 6, Tp. 19, Rge. 28, W. 4th Mer.

A plain staff gauge, graduated to feet and tenths, is fastened vertically to the downstream face of the centre pier. It is referred to bench marks as follows:—(1) top of crib pier to which the gauge height is fixed, elevation 10.41; (2) top of crib abutment on the left bank, elevation 10.40; (3) southwest corner of concrete pier supporting north end of C. P. R. bridge, elevation 8.38.

The channel is straight for about 300 feet above and below the station. The right bank is low and liable to overflow. It is composed of gravel and sand and covered with brush. The left bank is low but is protected from overflow by a crib work. The current is swift in high stages of the stream, but is sluggish in low water.

Discharge measurements are made from the downstream side of the bridge. The initial point for soundings is the inside edge of the crib abutment, supporting the north end of the bridge. Distances are marked on the bottom chord of the bridge at every five feet from the initial point. There is an eddy about the centre pier and special care must be exercised by the hydrographer in making discharge measurements at this station. At extreme low water, a check measurement is made at a wading section about 300 yards below the bridge.

Little Bow Ditch diverts water from Highwood River at a point about half a mile above this station. For some time previous to 1910, the diverting dam was out of repair and water could only be diverted during high water periods. In the summer of 1910 this dam was repaired and water has since been diverted. A gauge was established on the canal and records of the flow are given below.

During the flood in 1908, Highwood River overflowed its left bank some distance above the traffic bridge and did considerable damage to property. To prevent a repetition of this occurrence, a highwater overflow channel has been constructed from the Lineham Mill Pond to the river. The water carried off through this spillway does not pass the gauging station. During 1910, there was no flood and there was only an occasional flow through the spillway when the Company raised the water in the pond to float logs. Miscellaneous discharge measurements of this flow were made on the same day that Highwood River was measured. The flow through the Little Bow Ditch and Lineham's Spillway should both be added to the flow at the traffic bridge to obtain the total flow in Highwood River.

Daily observations of the gauge height at the regular station on Highwood River were made by W. E. M. Holmes during 1910.

DISCHARGE MEASUREMENTS of Highwood River at High River, in 1910.

DATE	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Discharge.
		<i>Feet.</i>	<i>Sq.-ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
May 12.....	H. C. Ritchie.....	136	441.72	1.77	3.05	780.04
May 18.....	J. C. Keith.....	133.7	432.42	1.61	2.99	696.61
June 9.....	do	141.2	453.97	2.105	3.225	955.92
July 7.....	do	89.4	365.43	1.35	2.68	492.94
July 30.....	do	79.4	328.61	0.67	2.15	219.85
Aug. 22.....	do	59.8	319.24	0.50	2.08	159.58
Sept. 14.....	do	80.4	325.39	0.77	2.27	251.59
Oct. 10.....	H. R. Carscallen.....	90.5	368.3	1.13	2.62	416.95
Nov. 12.....	do	100	103.5	1.75	2.14	180.77*

*Measurement taken at wading station near regular station.

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DAILY GAUGE HEIGHT AND DISCHARGE of Highwood River, at High River, for 1910

DAY.	April.		May.		June.	
	Gauge Height	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.ft.</i>
1.....	1.8	110	2.7	475	3.4	1,095
2.....	1.8	110	2.7	475	3.5	1,205
3.....	1.8	110	2.6	405	3.3	995
4.....	1.8	110	2.6	405	3.2	895
5.....	1.9	120	2.6	405	3.2	895
6.....	2.0	140	2.8	545	3.3	995
7.....	1.9	120	3.0	710	3.3	995
8.....	1.9	120	3.4	1,095	3.3	995
9.....	1.95	130	3.3	995	3.2	895
10.....	2.0	140	3.3	995	3.2	895
11.....	2.0	140	3.0	710	3.4	1,095
12.....	2.0	140	3.0	710	3.4	1,095
13.....	2.0	140	3.0	710	3.5	1,205
14.....	2.1	165	3.0	710	3.4	1,095
15.....	2.0	140	3.1	800	3.4	1,095
16.....	2.0	140	3.0	710	3.4	1,095
17.....	2.0	140	3.0	710	3.4	1,095
18.....	2.0	140	3.0	710	3.4	1,095
19.....	2.0	140	2.9	625	3.4	1,095
20.....	2.4	290	3.0	710	3.4	1,095
21.....	2.5	345	3.0	710	3.4	1,095
22.....	2.5	345	3.2	895	3.2	895
23.....	2.4	290	3.4	1,095	3.1	800
24.....	2.5	345	3.5	1,205	3.0	710
25.....	2.5	345	3.7	1,445	2.9	625
26.....	2.8	545	3.9	1,715	3.0	710
27.....	3.0	710	3.7	1,445	3.0	710
28.....	3.0	710	3.6	1,320	3.0	710
29.....	3.0	710	3.4	1,095	3.0	710
30.....	2.9	625	3.3	995	3.0	710
31.....			3.3	995		

DAILY GAUGE HEIGHT AND DISCHARGE of Highwood River, at High River, for 1910.—*Con.*

DAYS.	July.		August.		September.		October.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.
1.....	3.0	710	2.2	200	2.1	165	2.5	345
2.....	3.0	710	2.2	200	2.1	165	2.5	345
3.....	3.0	710	2.2	200	2.1	165	2.5	345
4.....	2.9	625	2.1	165	2.1	165	2.4	290
5.....	2.8	545	2.1	165	2.1	165	2.4	290
6.....	2.7	475	2.1	165	2.2	200	2.4	290
7.....	2.7	475	2.1	165	2.2	200	2.6	405
8.....	2.7	475	2.1	165	2.35	265	2.65	440
9.....	2.6	405	2.1	165	2.3	240	2.65	440
10.....	2.6	405	2.1	165	2.2	200	2.65	440
11.....	2.6	405	2.1	165	2.2	200	2.6	405
12.....	2.5	345	2.1	165	2.35	265	2.6	405
13.....	2.5	345	2.2	200	2.35	265	2.6	405
14.....	2.5	345	2.2	200	2.3	240	2.55	375
15.....	2.5	345	2.2	200	2.3	240	2.5	345
16.....	2.5	345	2.2	200	2.7	475	2.5	345
17.....	2.5	345	2.2	200	2.7	475	2.5	345
18.....	2.5	345	2.2	200	2.7	475	2.55	375
19.....	2.5	345	2.1	165	2.7	475	2.55	375
20.....	2.4	290	2.1	165	2.7	475	2.3	240
21.....	2.4	290	2.1	165	2.7	475	2.35	265
22.....	2.4	290	2.1	165	2.6	405	2.25	220
23.....	2.4	290	2.1	165	2.6	405	2.2	200
24.....	2.3	240	2.1	165	2.6	405	2.25	220
25.....	2.3	240	2.1	165	2.5	345	2.25	220
26.....	2.2	200	2.0	140	2.5	345	2.3	240
27.....	2.2	200	2.0	140	2.5	345	2.2	200
28.....	2.2	200	2.0	140	2.5	345	2.2	200
29.....	2.2	200	2.0	140	2.5	345	2.1	165
30.....	2.2	200	2.1	165	2.5	345	2.1	165
31.....	2.2	200	2.1	165	.....	.....	2.1	165

MONTHLY DISCHARGE of Highwood River at High River for 1910.
Drainage area, 760 square miles.

MONTH.	DISCHARGE IN SECOND-FEET.				RUN-OFF.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on Drainage area.	Total in acre-feet.
April.....	710	110	258.5	0.34	0.379	15,381
May.....	1,715	405	855.6	1.13	1.3	52,612
June.....	1,205	625	953.2	1.25	1.4	56,717
July*.....	400	226	398.4	0.524	0.604	24,497
August*.....	226	155	191.2	0.252	0.290	11,756
September*.....	540	178	351.3	0.462	0.515	20,904
October*.....	490	185	341.1	0.449	0.518	20,973
The period.....	.....	.....	.....	.....	.....	202,840

* Includes Little Bow Ditch.

LITTLE BOW DITCH AT HIGH RIVER.

This canal, about 2,000 feet in length, was built by the Alberta Government to divert water from Highwood River into Little Bow River. This latter stream has a small flow and in the dry season does not supply sufficient water for domestic and stock watering purposes. Some time after its construction the diverting dam was damaged and the ditch was not used till the summer of 1910 when the dam was repaired. The gauging station near High River, Alta, on the Highwood River is below the intake to the ditch so the discharge of the latter must be added to that obtained for the former to get the total discharge of the main stream.

This gauging station, located on Sec. 6, Tp. 19, Rge. 28, W. 4th Mer., at the traffic bridge and 100 feet from the power house of the town of High River, was established August 1st, 1910, by J. C. Keith.

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The gauge is a plain staff, graduated to feet and hundredths, spiked to the cribbing on the left bank. It is referred to a bench mark at the northeast corner of the power house foundation: elevation 12.18.

The channel is straight for several hundred feet above and below the station. Both banks are high, clean and steep, cribbed for 20 feet above and below the bridge, and will not overflow.

Discharge measurements are made from the bridge. The initial point for soundings is on a line with the cribbing on the left bank.

The gauge was read daily by Mr. Phil. Weinard.

DISCHARGE MEASUREMENTS of Little Bow Ditch at High River, in 1910

DATE	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Discharge.
		<i>Feet.</i>	<i>Sq.-ft.</i>	<i>Fl. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
May 12	H. C. Ritchie.....	3.0	0.71	1.21	.....	0.86
May 18	J. C. Keith.....				.....	0.35†
June 9	do .....				.....	Nil
July 6	do .....				.....	Nil
Aug. 1	do	10.6	18.48	1.38	2.49	25.53*
Aug. 22	do	10.6	16.41	0.95	2.22	15.52
Sept. 14	do	10.6	22.06	1.72	2.72	37.99
Oct. 12	H. R. Carscallen.....	10.5	23.83	1.78	2.84	42.62
Nov. 12	do	10.5	17.43	1.178	2.22	20.54

* No Gauge Height was established before Aug. 1st, 1910.
† Discharge estimated.

DAILY GAUGE HEIGHT AND DISCHARGE of Little Bow Ditch at High River, for 1910.

DAY.	July.		August.		September.		October.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1			2.5	26.5	2.2	14.5	2.82	41.5
2			2.5	26.5	2.17	13.0	2.82	41.5
3			2.42	23.5	2.3	18.5	2.8	40.5
4			2.32	19.5	2.4	22.5	2.8	40.5
5			2.32	19.5	2.5	26.5	2.75	38.0
6			2.32	19.5	2.7	35.5	2.72	36.5
7			2.4	22.5	3.02	51.5	2.72	36.5
8			2.5	26.5	2.8	40.5	3.0	50.5
9			2.35	20.5	2.7	35.5	2.95	48.0
10			2.32	19.5	2.7	35.5	2.9	45.5
11			2.32	19.5	2.8	40.5	2.9	45.5
12	3.1*	55.5	2.3	18.5	2.8	40.5	2.82	41.5
13	3.1	55.5	2.3	18.5	2.7	35.5	2.8	40.5
14	3.1	55.5	2.35	20.5	2.7	35.5	2.76	38.5
15	3.0	50.5	2.4	22.5	3.0	50.5	2.74	37.5
16	3.0	50.5	2.35	20.5	3.2	60.5	2.7	35.5
17	3.0	50.5	2.35	20.5	3.2	60.5	2.7	35.5
18	3.0	50.5	2.35	20.5	3.3	65.5	2.71	36.0
19	2.9	45.5	2.3	18.5	3.2	60.5	2.69	35.0
20	2.9	45.5	2.3	18.5	3.1	55.5	2.63	32.0
21	2.8	40.5	2.25	16.5	3.02	51.5	2.61	31.5
22	2.8	40.5	2.25	16.5	3.0	50.5	2.56	29.0
23	2.7	35.5	2.25	16.5	2.9	45.5	2.55	28.5
24	2.7	35.5	2.27	17.5	3.0	50.5	2.51	27.0
25	2.7	35.5	2.25	16.5	2.95	48.0	2.51	27.0
26	2.6	31.0	2.22	15.5	2.9	45.5	2.55	28.5
27	2.6	31.0	2.22	15.5	2.87	44.0	2.29	18.0
28	2.6	31.0	2.22	15.5	2.87	44.0	2.28	17.5
29	2.6	31.0	2.25	16.5	2.85	43.0	2.41	23.0
30	2.5	26.5	2.2	14.5	2.85	43.0	2.41	23.0
31	2.5	26.5	2.2	14.5	.....	.....	2.35	20.5

* Gauge height established on Aug. 1st, 1910, July 12th to 31st filled in by interpolation.

MISCELLANEOUS DISCHARGE MEASUREMENTS of Bow River Drainage Basin, in 1910.

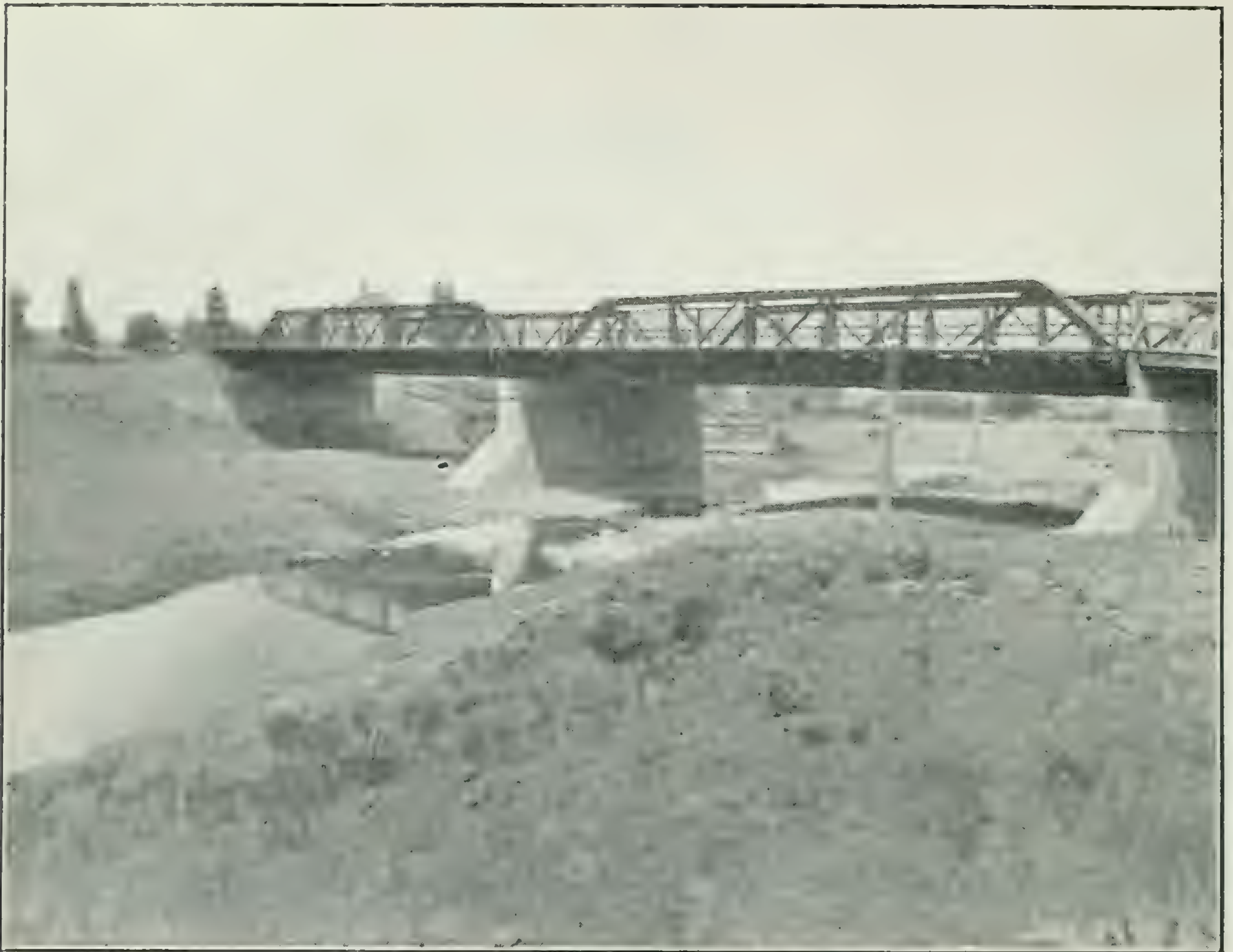
Date.	Stream.	Locality.	Hydrographer.	Width.	Area of Section.	Dis-charge.
				<i>Feet.</i>	<i>Sq.-Ft.</i>	<i>Sec.-ft.</i>
Aug. 1.....	Brown's Ditch.....	2-17-3-5.....	J. C. Keith.....			Nil.
May 24.....	Bighill Creek.....	10-26-4-5.....	".....	10.4	4.68	6.76
June 29.....	".....	".....	".....	10.5	4.85	4.85
July 22.....	".....	".....	".....	10	4.74	4.53
Aug. 17.....	".....	".....	".....	10.6	5.56	7.48
Sept. 8.....	".....	".....	".....	11.8	9.83	17.63
" 30.....	".....	".....	H. R. Carscallen...	10.8	5.64	4.93
May 24.....	Beaupre Creek.....	15-26-5-5.....	J. C. Keith.....			Nil.
June 29.....	".....	".....	".....			Nil.
July 22.....	".....	".....	".....			Nil.
Aug. 17.....	".....	".....	".....			Nil.
Sept. 8.....	".....	".....	".....	4.9	73	0.39
Oct. 1.....	".....	".....	H. R. Carscallen...			Nil.
Sept. 5.....	Calgary Waterworks.	N.W. 10-24-3-5....	J. C. Keith.....	†4	7.91	10.65
" 5.....	".....	".....	".....	*4	7.91	11.81
" 29.....	".....	".....	H. R. Carscallen...	3.8	9.62	9.44
June 4.....	Cascade River.....	S.E. 7-26-11-5.....	J. C. Keith.....	78.5	147.87	714.45
Sept. 1.....	".....	".....	".....	45	95	267.66
Oct. 18.....	".....	".....	H. R. Carscallen...	50.8	134.23	275.49
Nov. 7.....	".....	".....	".....	46.5	113.7	190.72
Aug. 1.....	Eckford's Ditch.....	10-19-29-4.....	J. C. Keith.....	3.3	0.84	0.66
April 24.....	Elbow River.....	25-23-2-5.....	J. S. Tempest.....			134.46
Dec. 20.....	".....	S.E. 10-24-3-5....	H. R. Carscallen...	37.5	65.3	179.48
" 3.....	Fisher's Ditch.....	8-20-2-5.....	J. C. Keith.....	2.8	0.43	0.23
" 4.....	Ford's Ditch.....	26-22-3-5.....	".....			Nil.
" 4.....	Fish Creek So. Branch	26-22-3-5.....	".....			Nil.
Aug. 4.....	Fish Creek No. Branch.	21-22-3-5.....	".....			Nil.
Oct. 7.....	".....	".....	H. R. Carscallen...	11.2	9.9	2.23
June 4.....	Fortymile Creek.....	35-25-12-5.....	J. C. Keith.....	78.5	229.97	161.22
" 17.....	".....	".....	".....	79	354.9	246.61
May 24.....	Grand Valley Creek..	24-26-5-5.....	".....	7.5	1.32	1.01
June 29.....	".....	".....	".....	6	0.49	0.18
July 22.....	".....	".....	".....			Nil.
Aug. 17.....	".....	".....	".....	7	3.26	2.23
Sept. 8.....	".....	".....	".....	9	7.3	8.12
Oct. 1.....	".....	".....	".....	8	3.3	0.78
May 24.....	Ghost River.....	13-26-6-5.....	H. R. Carscallen...	40.5	133.05	163.89
June 29.....	".....	".....	J. C. Keith.....	61	67.3	152.61
July 22.....	".....	".....	".....	41	130.4	215.42
Aug. 17.....	".....	".....	".....	69	142.85	325.78
Sept. 8.....	".....	".....	".....	70	156.25	352.47
Oct. 1.....	".....	".....	".....	67.5	148.08	264.67
July 30.....	Highwood River.....	17-18-2-5.....	H. R. Carscallen...	63.5	66.47	224.54
Oct. 12.....	".....	".....	J. C. Keith.....	131.5	197.02	419.78
Aug. 2.....	".....	N.E. 18-20-28-4....	H. R. Carscallen...	88	117.3	183.98
Oct. 10.....	".....	".....	J. C. Keith.....	144	215.42	386.64
May 24.....	Horse Creek.....	8-26-4-5.....	H. R. Carscallen...			Nil.
June 29.....	".....	".....	J. C. Keith.....			Nil.
July 22.....	".....	".....	".....			Nil.
Aug. 17.....	".....	".....	".....			Nil.
Sept. 8.....	".....	".....	".....	7.5	2.59	2.14
Oct. 1.....	".....	".....	H. R. Carscallen...			Nil.
Aug. 4.....	Jamieson's Ditch.....	21-22-3-5.....	J. C. Keith.....			Nil.
May 24.....	Jacob Creek.....	Stoney Indian Re-serve.....	".....			Nil.
Aug. 1.....	McLaughlin's Ditch..	35-18-29-4.....	".....	6	2.95	1.5
June 2.....	Meinsinger Creek....	N.E. 14-17-4-5....	J. S. Tempest.....	††.		0.06
May 11.....	Nose Creek.....	13-24-1-5.....	J. C. Keith.....	17.5	8.45	9.4
Aug. 27.....	".....	".....	".....	9.8	2.3	2.51
Sept. 10.....	".....	".....	".....	18.5	9	14.36
May 26.....	Pekisko Creek.....	N.W. 8-17-2-5....	J. S. Tempest.....			26.94
June 4.....	".....	N.E. 1-17-3-5.....	".....			18.18
July 29.....	".....	N.W. 8-17-2-5....	J. C. Keith.....	10	2.81	1.51
Sept. 15.....	".....	".....	".....	64.5	75.3	48.07
Oct. 11.....	".....	".....	H. R. Carscallen...	61	62.53	24.57
May 19.....	Sullivan Creek.....	S.W. 20-18-3-5....	J. S. Tempest.....			19.7
July 29.....	Stimson Creek.....	S.E. 14-17-2-5....	J. C. Keith.....			Nil.
Sept. 15.....	".....	".....	".....			Nil.
May 12.....	Spillway, on High-					
May 18.....	wood River.....	6-19-28-4.....	H. C. Ritchie.....			Nil.
June 9.....	".....	".....	J. C. Keith.....			Nil.
July 6.....	".....	".....	".....			Nil.
Aug. 1.....	".....	".....	".....	6.2	4.67	4.97
Aug. 22.....	".....	".....	".....	□	4.59	3.77
Sept. 14.....	".....	".....	".....	6.5	5.07	6.36
Oct. 10.....	".....	".....	".....	6.3	5.11	4.1
	".....	".....	H. R. Carscallen...	6.8	6.08	5.87

† One point method used.

* Two point method used.

†† Creek was dry on this date, 1,000 feet downstream.

‡ Weir measurement



Traffic Bridge over Lee Creek at Cardston, Alta



Sharp-crested, Rectangular, Wooden Weir.

MISCELLANEOUS DISCHARGE MEASUREMENTS of Bow River Drainage Basin, in 1910.—Continued.

Date.	Stream.	Locality.	Hydrographer.	Width.	Area of Section.	Dis-charge.
				<i>Feet.</i>		<i>Sec.-ft.</i>
May 4.....	Sheep River, N. Br..	N.E. 22-20-4-5....	J. S. Tempest.....			25.57
May 24.....	Spencer Creek.....	17-26-5-5.....	J. C. Keith.....	4.7	0.79	0.66
June 29.....	".....	".....	".....	4.5	0.65	0.48
July 22.....	".....	".....	".....	4.3	1.4	1.1
Aug. 17.....	".....	".....	".....	4.5	1.07	0.96
Sept. 8.....	".....	".....	".....	5	1.49	1.29
Oct. 1.....	".....	".....	H. R. Carscallen...	6	2.02	0.89
May 20.....	Trap Creek.....	N.W. 36-17-4-5....	J. S. Tempest.....			56.65
June 8.....	Tongueflag Creek....	S.W. 19-19-28-4...	J. C. Keith.....	8.5	3.21	1.86
July 6.....	".....	".....	".....			Nil.
Aug. 2.....	".....	".....	".....			Nil.
Aug. 22.....	".....	".....	".....			Nil.
Sept. 14.....	".....	".....	".....	8	2.49	1.48
Oct. 10.....	".....	".....	H. R. Carscallen...	6.3	1.68	0.27
June 8.....	Wallace's Ditch.....	7-19-28-4.....	J. C. Keith.....	7	6.15	5.97
July 6.....	".....	".....	".....	12	8.4	17.96

LITTLE BOW RIVER DRAINAGE BASIN.

General Description.

The source of the Little Bow River is a spring near the Town of High River in Sec. 6, Tp. 19, Rge. 28, W. 4th Mer. From here it flows in a South-easterly direction for about 100 miles and empties into Belly River. In the first few miles, the flow is augmented by a number of springs, and later by Mosquito Creek.

There is a comparatively large flow in this stream during the spring freshets but during summer it would under natural conditions dry up. There are a large number of ranchers and settlers on this stream and it is very important that there should be a good flow for domestic and stock watering purposes. For this reason, the Provincial Government has constructed a canal and diverts water from Highwood River into Little Bow River whenever desired.

MOSQUITO CREEK, NEAR NANTON,

This station was established August 1, 1908, by H. C. Ritchie. It is located at a traffic bridge, about four miles from Nanton, on the road from Nanton to Cayley. The bridge is on a road diversion on Sec. 30, Tp. 16, Rge. 28, W. 4th Mer.

A plain staff gauge, graduated to feet and hundredths, was at first placed about twenty feet upstream from the bridge, in the bed of the stream at the right bank and stayed to posts driven in the bank. This location was not altogether suitable, being on the opposite side of the stream from the observer and the hole about the gauge was continually filling in with sand and mud. During the winter the gauge was disturbed by frost. On July 7, 1909, Mr. Ritchie re-established the gauge on the opposite bank of the stream and built a plank crib about it and the difficulties above mentioned have been overcome. The elevation of the gauge is referred to the top of two spike heads in the south side of the bridge pier at the right bank of the stream; elevation 11.47.

The channel is straight for about 175 feet below the station, then curves to the left. Above the station the channel curves slightly to the left for about 500 feet, then it turns sharply to the left. The right bank is low at water's edge but high a few feet from it. Sand and mud accumulates on this bank at high water. The left bank is high and is of solid clay with a few boulders. There is only one channel at low water. The bridge piers divide the stream into three channels at flood stage.

Discharge measurements are made from the bridge at high water and flood stages. The initial point for soundings is the north end of the bridge. The current is very sluggish at the bridge at low water, and during this stage, discharge measurements should be made at a wading section, a distance above or below the bridge.

The gauge was read daily by A. J. Clever, who lives about 1,200 feet north of the bridge.

DISCHARGE MEASUREMENTS of Mosquito Creek, near Nanton, in 1910.

Date.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Discharge.
		<i>Feet.</i>	<i>Sq.-ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
May 14.....	H. C. Ritchie.....	17.5	8.99	0.79	2.53	7.16
June 9.....	J. C. Keith.....	6.0	1.93	1.62	2.36	3.02*
June 22.....	H. C. Ritchie.....	13.0	2.73	0.58	2.35	1.58
July 7.....	J. C. Keith.....				2.00	Nil.
Sept. 29.....	H. C. Ritchie.....	5.5	1.55	0.632	2.29	0.98
Oct. 24.....	do.....	6.5	1.90	0.89	2.37	1.69

* Measurement taken at Clever's farm.

DAILY GAUGE HEIGHT AND DISCHARGE of Mosquito Creek, near Nanton, for 1910.

DAY.	April.		May.		June.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	2.95	46.5	2.64	11.78	2.39	2.34
2.....	2.9	38.5	2.64	11.78	2.41	2.7
3.....	2.9	38.5	2.55	6.7	2.43	3.1
4.....	2.88	35.7	2.53	5.98	2.48	4.34
5.....	2.9	38.5	2.51	5.26	2.43	3.1
6.....	2.86	32.9	2.51	5.26	2.4	2.5
7.....	2.86	32.9	2.5	4.9	2.38	2.18
8.....	2.81	26.7	2.59	8.78	2.38	2.18
9.....	2.80	25.5	2.49	4.62	2.37	2.02
10.....	2.76	21.5	2.55	6.7	2.37	2.02
11.....	2.77	22.5	2.61	9.92	2.36	1.86
12.....	2.75	20.5	2.6	9.3	2.29	1.03
13.....	2.72	17.8	2.55	6.7	2.28	.95
14.....	2.73	18.7	2.53	5.98	2.26	.78
15.....	2.7	16.0	2.51	5.26	2.25	.7
16.....	2.67	13.84	2.54	6.34	2.23	.58
17.....	2.62	10.54	2.5	4.9	2.23	.58
18.....	2.61	9.92	2.5	4.9	2.21	.46
19.....	2.6	9.3	2.5	4.9	2.19	.36
20.....	2.6	9.3	2.5	4.9	2.25	.7
21.....	2.6	9.3	2.5	4.9	2.26	.78
22.....	2.59	8.78	2.48	4.34	2.3	1.1
23.....	2.59	8.78	2.45	3.5	2.3	1.1
24.....	2.53	5.98	2.43	3.1	2.28	.95
25.....	2.51	5.26	2.42	2.9	2.2	.4
26.....	2.51	5.26	2.4	2.5	2.19	.36
27.....	2.51	5.26	2.39	2.34	2.14	.17
28.....	2.52	5.62	2.39	2.34	2.13	.14
29.....	2.54	6.34	2.38	2.18	2.12	.11
30.....	2.62	10.54	2.36	1.86	2.11	.08
31.....			2.36	1.86		

DAILY GAUGE HEIGHT AND DISCHARGE of Mosquito Creek, near Nanton, for 1910.—*Con.*

DAY.	July.		August.		September.		October.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1	2.1	0.05	1.64	0.0	2.3	1.1	2.33	1.46
2	2.09	0.04	1.63	0.0	2.33	1.46	2.31	1.22
3	2.08	0.03	1.63	0.0	2.32	1.34	2.31	1.22
4	2.08	0.03	1.62	0.0	2.31	1.22	2.32	1.34
5	2.04	0.0	1.62	0.0	2.33	1.46	2.31	1.22
6	2.0	0.0	1.62	0.0	2.42	2.9	2.30	1.11
7	2.0	0.0	1.62	0.0	2.52	5.62	2.31	1.22
8	2.0	0.0	1.61	0.0	2.42	2.9	2.29	1.02
9	1.99	0.0	1.61	0.0	2.42	2.9	2.31	1.22
10	1.95	0.0	1.60	0.0	2.42	2.9	2.31	1.22
11	1.94	0.0	1.59	0.0	2.42	2.9	2.31	1.22
12	1.92	0.0	1.59	0.0	2.38	2.18	2.31	1.22
13	1.89	0.0	1.59	0.0	2.35	1.7	2.32	1.34
14	1.88	0.0	1.58	0.0	2.32	1.34	2.32	1.34
15	1.87	0.0	1.61	0.0	2.32	1.34	2.32	1.34
16	1.82	0.0	1.61	0.0	2.32	1.34	2.32	1.34
17	1.80	0.0	1.6	0.0	2.32	1.34	2.32	1.34
18	1.79	0.0	1.59	0.0	2.31	1.22	2.36	1.86
19	1.78	0.0	1.58	0.0	2.26	.78	2.39	2.34
20	1.77	0.0	1.57	0.0	2.25	.7	2.39	2.34
21	1.76	0.0	1.54	0.0	2.24	.64	2.38	2.18
22	1.73	0.0	1.52	0.0	2.23	.58	2.38	2.18
23	1.71	0.0	1.66	0.0	2.26	.78	2.38	2.18
24	1.71	0.0	1.66	0.0	2.39	2.34	2.37	2.02
25	1.7	0.0	1.65	0.0	2.41	2.7	2.37	2.02
26	1.69	0.0	1.65	0.0	2.35	1.7	2.37	2.02
27	1.68	0.0	1.65	0.0	2.37	2.02	2.4	2.5
28	1.67	0.0	1.64	0.0	2.31	1.22	2.4	2.5
29	1.66	0.0	1.63	0.0	2.3	1.1	2.4	2.5
30	1.65	0.0	1.62	0.0	2.31	1.22	2.4	2.5
31	1.64	0.0	1.62	0.0	.....	.....	2.41	2.7

July 5 to August 31 inclusive, no flow.

MONTHLY DISCHARGE of Mosquito Creek, near Nanton, for 1910.

Drainage area, 183 square miles.

MONTH.	DISCHARGE IN SECOND-FEET.				RUN-OFF.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on area.	Total in acre-feet.
April	46.5	5.26	18.56	0.102	0.114	1,104
May	11.78	1.86	5.38	0.029	0.034	331
June	4.34	0.08	1.32	0.007	0.008	79
July	0.05	0.0	0.005	0.0	0.0	0
August	0.0	0.0	0.0	0.0	0.0	0
September	5.62	0.58	1.76	0.009	0.01	105
October	2.7	1.02	1.72	0.009	0.01	107
The period .....	.....	.....	.....	.....	.....	1,726

NANTON CREEK, NEAR NANTON.

This station was established August 3, 1908, by P. M. Sauder. It is located at George Topper's Farm, near Nanton. It is on Sec. 20, Tp. 16, Rge. 28, W. 4th Mer., and almost directly west of Mr. Topper's stable.

The gauge, which is a plain staff, graduated to feet and hundredths, is driven vertically into the bed of the stream, at the left bank. It is attached by braces to posts in the bank. The bench mark is the top of a hub (wood stake with iron cap) on the right bank, about 75 feet south-east from the gauge; elevation 17.82 above the zero of the gauge.

This stream follows a very crooked course, but the channel is nearly straight for about 125 feet above the gauge and for about 75 feet below. The banks are well defined but not high and may overflow in excessive floods. The banks are composed of clay and covered with tough sod. The bed of the stream is composed of gravel, not liable to shift and free from vegetation.

Discharge measurements are made by wading at or near the gauge. At flood stage discharge measurements may be made at Mr. Topper's bridge, about 1,000 feet downstream from the gauge. The gauge was read once each day by Mr. George Topper.

DISCHARGE MEASUREMENTS of Nanton Creek, near Nanton, in 1910.

DATE	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Discharge.
		<i>Feet.</i>	<i>Sq.-ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
May 13.....	M. C. Ritchie.....		2.92	.78	5.3	2.27
June 9.....	J. C. Keith.....		0.53	.....	4.93	Nil.
June 22.....	H. C. Ritchie.....					Nil.
July 7.....	J. C. Keith.....					Nil.
*Sept. 29.....	P. M. Sauder.....		0.92	.377	5.03	.347
*Sept. 30.....	do.....		0.92	.377	5.03	.339
*Oct. 24.....	H. C. Ritchie.....		0.63	.238	4.96	.15

* Discharge determined by using 15 inch weir.
All areas calculated from cross section of May 13th.

DAILY GAUGE HEIGHT AND DISCHARGE of Nanton Creek, near Nanton, for 1910.

DAY.	April.		May.		June.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	5.4	3.3	5.4	3.3	5.15	1.0
2.....	5.35	2.7	5.4	3.3	5.15	1.0
3.....	5.3	2.25	5.35	2.7	5.15	1.0
4.....	5.3	2.25	5.35	2.7	5.1	.7
5.....	5.25	1.75	5.35	2.7	5.0	.25
6.....	5.25	1.75	5.3	2.25	5.0	.25
7.....	5.2	1.35	5.25	1.75	5.0	.25
8.....	5.2	1.35	5.25	1.75	5.0	.25
9.....	5.2	1.35	5.25	1.75	5.0	.25
10.....	5.3	2.25	5.25	1.75	5.0	.25
11.....	5.35	2.7	5.3	2.25	5.0	.25
12.....	5.35	2.7	5.4	3.3	5.0	.25
13.....	5.35	2.7	5.3	2.25	0.0	0.0
14.....	5.35	2.7	5.3	2.25	0.0	0.0
15.....	5.35	2.7	5.3	2.25	0.0	0.0
16.....	5.35	2.7	5.3	2.25	0.0	0.0
17.....	5.35	2.7	5.3	2.25	0.0	0.0
18.....	5.35	2.7	5.25	1.75	0.0	0.0
19.....	5.35	2.7	5.35	2.7	0.0	0.0
20.....	5.35	2.7	5.3	2.25	0.0	0.0
21.....	5.35	2.7	5.3	2.25	0.0	0.0
22.....	5.35	2.7	5.3	2.25	0.0	0.0
23.....	5.35	2.7	5.3	2.25	0.0	0.0
24.....	5.35	2.7	5.3	2.25	0.0	0.0
25.....	5.35	2.7	5.25	1.75	0.0	0.0
26.....	5.35	2.7	5.2	1.35	0.0	0.0
27.....	5.3	2.25	5.2	1.35	0.0	0.0
28.....	5.3	2.25	5.2	1.35	0.0	0.0
29.....	5.35	2.7	5.2	1.35	0.0	0.0
30.....	5.35	2.7	5.2	1.35	0.0	0.0
31.....			5.2	1.35		

DAILY GAUGE HEIGHT AND DISCHARGE of Nanton Creek, near Nanton, for 1910.—Continued.

DAY.	July.		August.		September.		October.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.
1.....	0.0	0.0	0.0	0.0	0.0	0.0	5.05	.45
2.....	0.0	0.0	0.0	0.0	0.0	0.0	5.05	.45
3.....	0.0	0.0	0.0	0.0	0.0	0.0	5.05	.45
4.....	0.0	0.0	0.0	0.0	0.0	0.0	5.05	.45
5.....	0.0	0.0	0.0	0.0	5.2	1.35	5.05	.45
6.....	0.0	0.0	0.0	0.0	5.6	6.3	4.95	.1
7.....	0.0	0.0	0.0	0.0	5.8	11.0	4.95	.1
8.....	0.0	0.0	0.0	0.0	5.8	11.0	4.95	.1
9.....	0.0	0.0	0.0	0.0	5.3	2.25	4.95	.1
10.....	0.0	0.0	0.0	0.0	5.1	.7	4.95	.1
11.....	0.0	0.0	0.0	0.0	5.1	.7	4.95	.1
12.....	0.0	0.0	0.0	0.0	5.1	.7	4.95	.1
13.....	0.0	0.0	0.0	0.0	5.1	.7	4.95	.1
14.....	0.0	0.0	0.0	0.0	5.1	.7	4.95	.1
15.....	0.0	0.0	0.0	0.0	5.05	.45	4.95	.1
16.....	0.0	0.0	0.0	0.0	5.05	.45	4.95	.1
17.....	0.0	0.0	0.0	0.0	5.05	.45	4.95	.1
18.....	0.0	0.0	0.0	0.0	5.05	.45	5.0	.25
19.....	0.0	0.0	0.0	0.0	5.05	.45	5.0	.25
20.....	0.0	0.0	0.0	0.0	5.05	.45	5.0	.25
21.....	0.0	0.0	0.0	0.0	5.05	.45	5.0	.25
22.....	0.0	0.0	0.0	0.0	5.05	.45	5.0	.25
23.....	0.0	0.0	0.0	0.0	5.05	.45	5.0	.25
24.....	0.0	0.0	0.0	0.0	5.1	.7	4.95	.1
25.....	0.0	0.0	0.0	0.0	5.1	.7	4.95	.1
26.....	0.0	0.0	0.0	0.0	5.05	.45	4.95	.1
27.....	0.0	0.0	0.0	0.0	5.05	.45	4.95	.1
28.....	0.0	0.0	0.0	0.0	5.05	.45	4.95	.1
29.....	0.0	0.0	0.0	0.0	5.05	.45	4.95	.1
30.....	0.0	0.0	0.0	0.0	5.05	.45	4.95	.1
31.....	0.0	0.0	0.0	0.0	.....	.....	4.95	.1

MONTHLY DISCHARGE of Nanton Creek, near Nanton, for 1910.

Drainage area, 44 square miles.

MONTH.	DISCHARGE IN SECOND-FEET.				RUN-OFF.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in Inches on Drainage area.	Total in acre-feet.
April.....	3.3	1.35	2.45	.0557	.0621	146
May.....	3.3	1.35	2.14	.0486	.0560	131
*June.....	1.0	0.25	0.19	.0043	.0045	11
*July.....	.....	.....	.....	.....	.....	.....
*August.....	.....	.....	.....	.....	.....	.....
*September 5-30.....	11.0	0.45	1.66	.0377	.0364	86
October.....	0.45	0.1	0.185	.0042	.0048	11
The period.....	.....	.....	.....	.....	.....	385

* Creek dry from June 13th to Sept. 5th.

MISCELLANEOUS DISCHARGE MEASUREMENTS of Little Bow River Drainage Basin, in 1910.

Date.	Stream.	Locality.	Hydrographer.	Width.	Area of Section.	Discharge.
Nov. 3....	Greig's Ditch.....	S.E. 11-16-29-4....	J. S. Tempest.....	.....	.....	0.06
June 17....	Nanton Creek.....	N.E. 22-15-29-4....	".....	¶.....	.....	0.138
June 20....	".....	N.W. 31-15-28-4....	".....	.....	.....	0.18
Sept. 30....	Spring A.....	N.W. 3-16-29-4....	P. M. Sauder.....	†.....	.....	0.27
" 30....	".....	".....	".....	†.....	.....	0.04
Nov. 3....	".....	S.W. 3-16-29-4....	J. S. Tempest.....	.....	.....	0.166
" 3....	".....	N.W. 3-16-29-4....	".....	.....	.....	0.034
June 20....	Spring Creek.....	S.W. 12-16-29-4....	".....	.....	.....	0.203
June 16....	Springhill Creek.....	".....	".....	*.....	.....	0.118
" 20....	".....	Sec. 3-16-29-4....	".....	.....	.....	0.404
Oct. 1....	".....	S.W. 12-16-29-4....	P. M. Sauder.....	.....	.....	0.41
Nov. 3....	".....	S.E. 11-16-29-4....	J. S. Tempest.....	.....	.....	0.15
" 3....	Springhill Ck. Br. of	".....	".....	.....	.....	0.03
" 3....	Springhill Creek.....	".....	".....	†.....	.....	0.18
" 3....	".....	N.E. 12-16-29-4....	".....	.....	.....	0.02

‡ Below junction with Branch.

* Same Creek 1,000 ft. down-stream was dry on this date.

† These two springs combined form Springhill Creek, the 2nd is the one furthest West.

¶ Same Creek dry, one mile down-stream on this date, but at N.E. 25-15-29-4 had about 0.1 sec.-ft. discharge.

OLDMAN RIVER DRAINAGE BASIN.

General Description.

Oldman River, one of the principal tributaries of the South Saskatchewan River, is formed in the Livingstone Range of the Rocky Mountains by the junction of four small rivers, viz., Livingstone, Northwest Branch, West Branch and Racehorse Creek; and flows in a south and easterly direction to near Cowley where it is joined by the Crowsnest and Southfork Rivers. Between Cowley and Kipp, where it empties into the Belly River, the Oldman River is augmented by numerous small rivers and creeks, its course being easterly and northerly. It drains the area bounded on the north by the parallel of latitude through $59^{\circ} 20'$, on the south by a parallel through $49^{\circ} 20'$, and on the west by the Great Divide, this area being estimated to contain about 2,235 square miles, with topography varying from mountainous to rolling prairie.

The bed of the river is of rock and gravel and has a sharp fall with consequent swift water interspersed with falls and rapids, but it changes to quicksand and mud after reaching the prairie region where the current is more sluggish.

The flow of this river, draining as it does mountain ranges with peaks extending above the snow line, is subject to great changes, caused by melting snow and heavy summer rains in the mountains. Floods occur regularly in both May and June, the one in June generally rising higher and lasting longer. From this time on however the flow is normally steady but gradually decreases until the minimum is reached during January and February.

The precipitation throughout the basin is quite large, consequently, though almost entirely under cultivation where practicable there is little need of irrigation. Indeed, owing to the depth of the valley and its steep rocky banks, irrigation from this river would be expensive if not impossible, but there are many excellent power sites at its falls and rapids. Up to the present, however, no power has been developed on this river, but investigations with that end in view are being planned for the coming summer.

TROUT CREEK AT STEVENSON'S FARM.

This gauging station, located at the traffic bridge on the road allowance east of the S.E. $\frac{1}{4}$ Sec. 12, Tp. 12, Rge. 28, W. 4th Mer., and about 7 miles southwest of Claresholm, was established May 14th, 1909, by H. C. Ritchie.

The gauge is a plain staff, graduated to feet and hundredths, fastened to the left abutment of the bridge. It is referred to a bench mark on top of the outer, downstream pile of the same abutment; elevation 7.99.

The channel is straight for 60 feet above and 50 feet below the station. Both banks are low wooded and liable to overflow during high water. The bed of the stream is sand and gravel. The current is fairly swift.

Discharge measurements are taken from the bridge during high water stages, the initial point for soundings being in line with the inner face of the left abutment. In low water the stream is waded at the same section.

The gauge was read daily by Mr. John Stevenson.



Traffic Bridge over the Bow River at Banff, Alta.



Traffic Bridge over Jumpingpound Creek, near Jumping Pound, P. O., Alta

SESSIONAL PAPER No. 25d

DISCHARGE MEASUREMENTS of Trout Creek, near Claresholm, in 1910.

Date.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Dis-charge.
		<i>Feet.</i>	<i>Sq. ft.</i>	<i>Ft per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
May 17.....	H. C. Ritchie.....	28.0	13.52	0.44	0.75	5.92
June 10.....	J. C. Keith.....	9.0	2.31	1.24	0.65	2.86 *
June 21.....	H. C. Ritchie.....	2.2	0.49	0.51	0.43	0.25 *
July 11.....	".....	2.4	0.31	0.547	0.40	0.17 *
Aug. 29.....	".....	2.0	0.18	0.11	0.39	0.20 *
Sept. 26.....	".....	27.8	9.65	0.33	0.65	3.14
Oct. 21.....	".....				0.43	0.323†

* Measurements taken at wading stations near regular station.
† Discharge determined by using 15-inch weir.

DAILY GAUGE HEIGHT AND DISCHARGE of Trout Creek, near Claresholm, for 1910.

DAY.	April.		May.		June.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....						
2.....			.8	6.9	.6	2.1
3.....					.6	2.1
4.....					.6	2.1
5.....	.9	10.5	.8	6.9		
6.....					.6	2.1
7.....	.9	10.5	.8	6.9	.6	2.1
8.....					.6	2.1
9.....						
10.....			.8	6.9	.6	2.1
11.....					.6	2.1
12.....			.9	10.5		
13.....	.9	10.5			.5	.9
14.....			.9	10.5	.5	.9
15.....					.4	.2
16.....	.8	6.9				
17.....			.8	6.9	.4	.2
18.....	.8	6.9				
19.....			.9	10.5		
20.....					.4	.2
21.....			.8	6.9	.4	.2
22.....						
23.....	.8	6.9			.4	.2
24.....					.4	.2
25.....			.6	2.1	.4	.2
26.....			.6	2.1		
27.....	.8	6.9				
28.....			.6	2.1	.4	.2
29.....						
30.....	.8	6.9	.6	2.1	.4	.2
31.....						

DAILY GAUGE HEIGHT AND DISCHARGE of Trout Creek, near Claresholm, for 1910.—Continued.

DAY.	July.		August.		September.		October.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.
1.....			.4	.2	.4	.2		
2.....	.4	.2						
3.....					.4	.2	.6	2.1
4.....								
5.....	.4	.2	.4	.2				
6.....			.4	.2	.4	.2	.6	2.1
7.....					.7	4.1		
8.....	.4	.2			.7	4.1	.6	2.1
9.....			.4	.2	.7	4.1		
10.....					.7	4.1		
11.....	.4	.2					.6	2.1
12.....	.4	.2			.7	4.1		
13.....			.4	.2	.7	4.1		
14.....	.4	.2			.7	4.1		
15.....					.7	4.1	.6	2.1
16.....	.4	.2	.4	.2	.7	4.1		
17.....			.4	.2	.7	4.1		
18.....							.6	2.1
19.....	.4	.2			.6	2.1		
20.....			.4	.2	.6	2.1		
21.....	.4	.2					.4	.2
22.....								
23.....	.4	.2	.4	.2	.6	2.1		
24.....								
25.....			.4	.2			.4	.2
26.....	.4	.2			.6	2.1		
27.....			.4	.2			.4	.2
28.....					.6	2.1		
29.....	.4	.2					.4	.2
30.....					.6	2.1		
21.....			.4	.2			.4	.2

MONTHLY DISCHARGE of Trout Creek, near Claresholm, for 1910.

Dranage area, 168 square miles.

MONTH.	DISCHARGE IN SECOND-FEET.				RUN-OFF.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in Inches on Drainage area.	Total in acre-feet.
April (8 days).....	10.5	6.9	8.25	0.049	0.015	131
May (13 days).....	10.5	2.1	6.25	0.037	0.018	161
June (19 days).....	2.1	0.2	1.07	0.0063	0.0044	40
July (12 days).....	0.2	0.2	0.2	0.0012	0.0005	5
August (12 days).....	0.2	0.2	0.2	0.0012	0.0005	5
September (19 days).....	4.1	0.2	2.85	0.017	0.012	107
October (11 days).....	2.1	0.2	1.24	0.0073	0.003	27
The period.....						476

MUDDYPOUND CREEK, AT HART'S RANCHE.

This gauging station, located on the S.W. $\frac{1}{4}$ Sec. 27, Tp. 11, Rge. 28, W. 4th Mer., at the foot-bridge on L. O. Hart's ranche, was established July 27th, 1908, by H. C. Ritchie.

The gauge is a plain staff, graduated to feet and hundredths, placed at the left bank 15 feet upstream, from the bridge. It is referred to a bench mark on an iron pin near a post 35 feet northeast of the gauge; elevation 8.94.

The channel is straight for 30 feet above and 110 feet below the station. Both banks are high, clayey, and liable to overflow in extreme floods. The bed is of clean gravel. The current is fairly swift.

Discharge measurements are taken from the bridge in high water, the initial point for soundings being marked at the left end of the bridge. At low stages the creek is waded about 100 feet upstream.

The gauge was read daily by Mrs. M. E. Hart.

DISCHARGE MEASUREMENTS of Muddypound Creek, Hart's Ranche, in 1910.

Date.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Dis-charge.
		<i>Feet.</i>	<i>Sq. ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
May 17.....	H. C. Ritchie.....	13.5	11.95	0.14	2.05	1.71
May 17.....	".....	8.0	2.23	0.85	2.05	1.89
June 10.....	J. C. Keith.....	6.0	1.35	0.79	2.04	1.07*
June 21.....	H. C. Ritchie.....					Dry*
July 11.....	".....					Dry
Aug. 29.....	".....					Dry
Sept. 26.....	".....	5.5	1.02	0.78	2.03	0.8
Oct. 21.....	".....				2.04	0.67†

* Measurement taken at wading station near regular station.
† Discharge determined by using 15 inch weir.

DAILY GAUGE HEIGHT AND DISCHARGE of Muddypound Creek, at Hart's Ranche, for 1910.

DAY.	April.		May.		June.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	2.25	5.6	2.1	2.5	2.0	1.2
2.....	2.25	5.6	2.1	2.5	2.0	1.2
3.....	2.25	5.6	2.1	2.5	2.0	1.2
4.....	2.25	5.6	2.1	2.5	2.0	1.2
5.....	2.25	5.6	2.1	2.5	2.0	1.2
6.....	2.25	5.6	2.1	2.5	2.0	1.2
7.....	2.25	5.6	2.1	2.5	2.0	1.2
8.....	2.25	5.6	2.1	2.5	2.0	1.2
9.....	2.2	4.4	2.1	2.5	2.1	2.5
10.....	2.2	4.4	2.3	7.0	2.0	1.2
11.....	2.2	4.4	2.25	5.6	2.0	1.2
12.....	2.2	4.4	2.25	5.6	1.9	0.5
13.....	2.2	4.4	2.2	4.4	1.9	0.5
14.....	2.1	2.5	2.2	4.4	1.9	0.5
15.....	2.1	2.5	2.1	2.5	1.8	0.1
16.....	2.1	2.5	2.1	2.5	1.8	0.1
17.....	2.1	2.5	2.05	1.8	1.8	0.1
18.....	2.1	2.5	2.05	1.8	1.8	0.1
19.....	2.1	2.5	2.05	1.8	0	0
20.....	2.1	2.5	2.05	1.8	0	0
21.....	2.1	2.5	2.05	1.8	0	0
22.....	2.1	2.5	2.03	1.6	0	0
23.....	2.1	2.5	2.03	1.6	0	0
24.....	2.1	2.5	2.01	1.3	0	0
25.....	2.1	2.5	2.01	1.3	0	0
26.....	2.1	2.5	2.0	1.2	0	0
27.....	2.1	2.5	2.0	1.2	0	0
28.....	2.1	2.5	2.0	1.2	0	0
29.....	2.1	2.5	2.0	1.2	0	0
30.....	2.1	2.5	2.0	1.2	0	0
31.....			2.0	1.2		

DAILY GAUGE HEIGHT AND DISCHARGE of Muddypound Creek, at Hart's Ranche, for 1910—*Con.*

DAY.	July.		August.		September.		October.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	0	0	0	0	0	0	2.0	1.2
2.....	0	0	0	0	0	0	2.0	1.2
3.....	0	0	0	0	0	0	2.0	1.2
4.....	0	0	0	0	0	0	2.0	1.2
5.....	0	0	0	0	0	0	2.0	1.2
6.....	0	0	0	0	0	0	2.0	1.2
7.....	0	0	0	0	1.0	.....	2.0	1.2
8.....	0	0	0	0	1.1	.....	2.0	1.2
9.....	0	0	0	0	1.2	.....	2.0	1.2
10.....	0	0	0	0	1.3	.....	2.0	1.2
11.....	0	0	0	0	1.4	.....	2.0	1.2
12.....	0	0	0	0	1.5	.....	2.0	1.2
13.....	0	0	0	0	1.6	.....	2.0	1.2
14.....	0	0	0	0	1.7	.....	2.0	1.2
15.....	0	0	0	0	1.7	.....	2.0	1.2
16.....	0	0	0	0	1.7	.....	2.0	1.2
17.....	0	0	0	0	1.7	.....	2.0	1.2
18.....	0	0	0	0	1.7	.....	2.05	1.8
19.....	0	0	0	0	1.8	0.1	2.05	1.8
20.....	0	0	0	0	1.8	0.1	2.04	1.7
21.....	0	0	0	0	1.8	0.1	2.04	1.7
22.....	0	0	0	0	1.8	0.1	2.04	1.7
23.....	0	0	0	0	1.8	0.1	2.04	1.7
24.....	0	0	0	0	2.0	1.2	2.04	1.7
25.....	0	0	0	0	2.0	1.2	2.03	1.6
26.....	0	0	0	0	2.0	1.2	3.03	1.6
27.....	0	0	0	0	2.0	1.2	2.03	1.6
28.....	0	0	0	0	2.0	1.2	2.03	1.6
29.....	0	0	0	0	2.0	1.2	2.03	1.6
30.....	0	0	0	0	2.0	1.2	2.03	1.6
31.....	0	0	0	0	.0	.....	2.03	1.6

Creek dry from June 19th to Sept. 18th.

MONTHLY DISCHARGE of Muddypound Creek at Hart's Ranche, for 1910.

[Drainage area, 43 square miles.]

MONTH.	DISCHARGE IN SECOND-FEET.				RUN-OFF.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in Inches on Drainage area.	Total in acre-feet.
April.....	5.6	2.5	3.64	0.85	0.95	217
May.....	7.0	1.2	2.47	0.57	0.66	152
*June.....	2.5	0	0.547	0.013	0.15	33
*July.....						
*August.....						
*September.....	1.2	0	0.296	0.007	0.008	18
October.....	1.8	1.2	1.41	0.33	0.38	87
The period.....						507

* Creek dry from June 19th to Sept. 18th.

WILLOW CREEK, NEAR MACLEOD.

This gauging station, located at the traffic bridge on the S.W.¹/₄ Sec. 25, Tp. 9, Rge.26,W. 4th Mer., was established July 1st, 1909, by H. C. Ritchie.

The gauge is a plain staff, graduated to feet and hundredths, placed in a stilling box about 300 yards upstream from the bridge and near Mr. McLean's stable. It is referred to a bench mark on a post 150 feet north of the gauge; elevation 8.41.

The channel is straight for about 600 feet above and below the station. The right bank is high and wooded. The left bank is low, wooded and liable to overflow in high water stages. The bed of the stream is of clean gravel. The slope is uniform and the current swift.

Discharge measurements are taken from the bridge during high stages, initial point for soundings being marked on the downstream handrail on a line with a face of the north abutment. During low stages the river is waded at the same section and at the gauge rod when near zero flow.

The gauge was read daily by Jas. R. McLean.

DISCHARGE MEASUREMENTS of Willow Creek, near Macleod, in 1910.

Date.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Dis-charge.
		<i>Feet.</i>	<i>Sq. ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
May 19.....	H. C. Ritchie.....	55	74.70	0.766	1.81	57.26
June 23.....	".....	26	15.93	1.27	1.41	20.13*
July 12.....	".....	21	9.51	0.59	1.13	5.59*
Aug. 8.....	".....	10.2	3.73	0.504	1.02	1.88*
Aug. 30.....	".....	13.6	5.29	0.82	1.11	4.35*
Sept. 22.....	".....	60	81.80	0.90	1.95	73.93
Oct. 27.....	".....	47.5	56.55	0.41	1.49	23.36

* Measurements taken at wading stations near regular station.

DAILY GAUGE HEIGHT AND DISCHARGE of Willow Creek, near Macleod, in 1910.

DAY.	April.		May.		June.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	1.7	45	1.7	45	1.6	35
2.....	1.7	45	1.8	56	1.6	35
3.....	1.7	45	1.8	56	1.6	35
4.....	1.7	45	1.8	56	1.6	35
5.....	1.7	45	1.8	56	1.6	35
6.....	1.7	45	1.7	45	1.6	35
7.....	1.7	45	1.7	45	1.6	35
8.....	1.7	45	1.7	45	1.6	35
9.....	1.7	45	1.7	45	1.6	35
10.....	1.7	45	1.7	45	1.6	35
11.....	1.7	45	1.8	56	1.6	35
12.....	1.7	45	1.8	56	1.5	25.5
13.....	1.7	45	1.9	68	1.5	25.5
14.....	1.7	45	1.9	68	1.5	25.5
15.....	1.7	45	1.8	56	1.5	25.5
16.....	1.7	45	1.8	56	1.4	18
17.....	1.7	45	1.8	56	1.4	18
18.....	1.6	35	1.8	56	1.4	18
19.....	1.6	35	1.8	56	1.4	18
20.....	1.6	35	1.8	56	1.4	18
21.....	1.6	35	1.8	56	1.3	12
22.....	1.6	35	1.8	56	1.3	12
23.....	1.6	35	1.8	56	1.3	12
24.....	1.6	35	1.8	56	1.3	12
25.....	1.6	35	1.8	56	1.4	18
26.....	1.6	35	1.8	56	1.4	18
27.....	1.6	35	1.8	56	1.3	12
28.....	1.6	35	1.7	45	1.3	12
29.....	1.6	35	1.7	45	1.3	12
30.....	1.6	35	1.6	35	1.2	7.5
31.....			1.6	35		

DAILY GAUGE HEIGHT AND DISCHARGE of Willow Creek, near Macleod, for 1910. —Continued.

DAY.	July.		August.		September.		October.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.
1.....	1.2	7.5	.95	1.0	1.14	5.2	1.9	68
2.....	1.2	7.5	.95	1.0	1.17	6.3	1.89	67
3.....	1.2	7.5	.95	1.0	1.21	7.9	1.89	67
4.....	1.2	7.5	.94	.9	1.21	7.9	1.92	70
5.....	1.2	7.5	.94	.9	1.23	8.7	1.9	68
6.....	1.1	4.0	.94	.9	1.27	10.5	1.88	66
7.....	1.1	4.0	.96	1.1	1.48	23.9	1.85	62
8.....	1.1	4.0	1.02	1.9	1.52	27.3	1.81	57
9.....	1.1	4.0	1.03	2.1	1.57	32	1.79	55
10.....	1.1	4.0	1.08	3.4	1.62	37	1.76	51
11.....	1.1	4.0	1.06	2.8	1.68	43	1.8	56
12.....	1.1	4.0	1.03	2.1	1.58	33	1.72	47
13.....	1.11	4.3	1.02	1.9	1.6	35	1.71	46
14.....	1.08	3.4	1.04	2.3	1.66	41	1.7	45
15.....	1.06	2.8	1.08	3.4	1.78	54	1.69	44
16.....	1.04	2.3	1.05	2.5	1.8	56	1.68	43
17.....	1.03	2.1	1.05	2.5	1.83	60	1.67	42
18.....	1.02	1.9	1.06	2.8	1.86	63	1.68	43
19.....	1.01	1.7	1.07	3.1	1.88	66	1.68	43
20.....	1.0	1.5	1.07	3.1	1.96	75	1.67	42
21.....	.99	1.4	1.08	3.4	2.02	82	1.66	41
22.....	.99	1.4	1.08	3.4	1.95	74	1.64	39
23.....	.98	1.3	1.09	3.7	1.91	69	1.63	38
24.....	.98	1.3	1.1	4.0	1.93	72	1.63	38
25.....	.97	1.2	1.11	4.3	1.9	68	1.62	37
26.....	.97	1.2	1.11	4.3	1.92	70	1.6	35
27.....	.97	1.2	1.1	4.0	1.94	73	1.49	24.7
28.....	.97	1.2	1.1	4.0	1.84	61	1.48	23.9
29.....	.96	1.1	1.1	4.0	1.89	67	1.73	48
30.....	.96	1.1	1.11	4.3	1.91	69	1.62	37
31.....	.96	1.1	1.11	4.3	.....	.....	1.58	33

MONTHLY DISCHARGE of Willow Creek, near Macleod, for 1910.
[Drainage area, 750 square miles.]

MONTH.	DISCHARGE IN SECOND-FEET.				RUN-OFF.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in Inches on Drainage area.	Total in acre-feet.
April.....	45	35	40.67	0.054	0.06	2,420
May.....	68	35	52.58	0.07	0.081	3,233
June.....	35	7.5	23.48	0.031	0.035	1,397
July.....	7.5	1.1	3.2	0.0043	0.005	196
August.....	4.3	.9	2.72	0.0036	0.0041	167
September.....	82	5.2	46.59	0.062	0.069	772
October.....	70	23.9	47.63	0.064	0.073	2,928
The period.....						11,113

OLDMAN RIVER, NEAR MACLEOD.

A gauging station was established on this river in 1906 by Mr. J. F. Hamilton. During the floods in June, 1908, this cross-section was so altered that it was abandoned. On July 12th, 1910, a station was established at the traffic bridge on the N.W.¹/₄ Sec. 10, Tp. 9, Rge. 26, W. 4th Mer., by H. C. Ritchie.

The gauge is a plain staff, graduated to feet and hundredths, fastened to a crib protecting the pier near the right bank. It is referred to a bench mark on spikes in a wooden bent, 93 feet east of the gauge; elevation 11.96.

The channel is straight for 400 feet above and 1,000 feet below the station. The right bank is low, wooded, and liable to overflow at extreme high water. The left bank is low, wooded and liable to overflow during high water. The bed is of clean gravel, and shifts during high water stages. The current is swift, especially during high water.

Discharge measurements are taken from the bridge, the initial point for soundings being at the left end of the handrail on the downstream side.

The gauge was read daily by Mrs. Walter Jackson.

DISCHARGE MEASUREMENTS of Oldman River, near Macleod, in 1910.

Date.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Dis-charge.
		<i>Feet.</i>	<i>Sq. ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
June 24.....	H. C. Ritchie.....	91	393.5	4.63	4.6	1,823.3
July 13.....	".....	95	304.82	3.19	3.85	974.05
Aug. 8.....	".....	81	248.63	2.13	3.15	529.64
Sept. 1.....	".....	29.5	216.45	1.7	2.85	368.13
Sept. 22.....	".....	84	288.5	3.01	3.72	868.8
Oct. 1.....	".....	83	284.8	2.89	3.69	824.79†
Oct. 1.....	".....	83	284.8	2.95	3.69	839.5*
Oct. 1.....	".....	83	284.8	2.92	3.69	830.61¶
Oct. 25.....	".....	83	267.15	2.92	3.56	779.46
Nov. 15.....	".....	85	293.45	3.32	3.85	975.37

† One point method used.
* Two point method used.
¶ Three point method used.

DAILY GAUGE HEIGHT AND DISCHARGE of Oldman River, near Macleod, for 1910.

DAY.	July.		August.		September.		October.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....			3.3	555	2.85	370	3.67	816
2.....			3.3	555	2.85	370	3.85	975
3.....			3.2	505	2.84	367	3.92	1,040
4.....			3.2	505	2.83	364	3.95	1,070
5.....			3.2	505	2.83	364	3.97	1,090
6.....			3.2	505	2.82	361	3.97	1,090
7.....			3.16	487	3.18	496	3.98	1,100
8.....			3.15	482	3.2	505	3.99	1,110
9.....			3.14	478	3.17	492	3.99	1,110
10.....			3.14	478	3.12	469	4.22	1,354
11.....			3.13	474	3.15	482	4.24	1,378
12.....	3.85	975	3.12	469	3.13	474	4.24	1,378
13.....	3.8	930	3.11	465	3.11	465	4.23	1,366
14.....	3.8	930	3.1	460	3.11	465	4.22	1,354
15.....	3.8	930	3.09	456	3.15	482	4.21	1,342
16.....	3.8	930	3.1	460	3.2	505	4.2	1,330
17.....	3.7	840	3.1	460	3.4	615	3.99	1,110
18.....	3.7	840	3.09	456	3.6	760	3.91	1,030
19.....	3.7	840	3.08	452	3.75	885	3.85	975
20.....	3.7	840	3.07	448	3.8	930	3.83	957
21.....	3.6	760	3.08	452	3.85	975	3.78	912
22.....	3.6	760	3.07	448	3.72	858	3.7	840
23.....	3.5	685	3.05	440	3.72	858	3.65	800
24.....	3.5	685	3.04	436	3.7	840	3.6	760
25.....	3.4	615	3.02	428	3.68	824	3.56	730
26.....	3.4	615	3.01	424	3.66	808	3.65	800
27.....	3.4	615	2.9	385	3.68	824	3.74	876
28.....	3.4	615	2.97	410	3.7	840	3.82	948
29.....	3.4	615	2.96	406	3.7	840	3.89	1,011
30.....	3.3	555	2.94	399	3.68	824	3.97	1,090
31.....	3.3	555	2.93	396			3.89	1,011

MONTHLY DISCHARGE of Oldman River, near Macleod, for 1910.
[Drainage area, 2,235 square miles.]

MONTH.	DISCHARGE IN SECOND-FEET.				RUN-OFF.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in Inches on Drainage area.	Total in acre-feet.
July (12 to 31).....	975	555	756.5	0.338	0.251	30,002
August.....	555	385	460.6	0.206	0.237	28,321
September.....	975	361	623.7	0.279	0.311	37,113
October.....	1,378	730	1,056.6	0.473	0.545	64,969
The period.....						160,405

OLDMAN RIVER, NEAR COWLEY.

This gauging station, located at a ford on the N.W.¹/₄ Sec. 34, Tp. 7, Rge. 1, W. 5th Mer., and approximately four miles north-east of Cowley, was established by H. C. Ritchie on September 15th, 1908.

The gauge is a plain staff, graduated to feet and hundredths. It is securely fastened to a post on the right bank and is connected with the channel by a ditch. It is referenced by two bench marks. (1) On a tree 20 feet upstream; elevation 9.63. (2) On a stone, 15 feet downstream; elevation 3.32. During the summer months the gauge reader, Mr. Hugh W. Pettit, moves upstream about one mile. In order that the readings should not be interrupted, a new rod was placed on the right of the river, within 50 yards of his temporary dwelling. On the periodic trips of the hydrographer both rods are read rating curves being plotted for each section.

The discharge measurements are taken at the lower rod, where a cable station has been erected for use during high water stages. At low water the river is waded at the same section. The points for soundings are permanently marked by a tagged wire, stretched, directly above the cable.

The channel is straight for about 900 feet above and 250 feet below the section. The bed is of rock and gravel and is free from vegetation. The current has considerable velocity but flows smoothly till about 150 feet below the section where it breaks into small rapids.

Both banks are high and wooded, neither being liable to overflow.

DISCHARGE MEASUREMENTS of Oldman River, near Cowley, in 1910.

Date.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Discharge.
		<i>Feet.</i>	<i>Sq. ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
May 24.....	H. C. Ritchie.....	194	365.4	3.72	2.78	1,359.47
June 7.....	".....	193	310.35	3.20	2.56	993.89
July 4.....	".....	178	200.12	2.265	2.98	453.4
July 25.....	".....	146	130.4	1.75	1.66	228.76
Aug. 24.....	".....	136	117.1	1.57	1.53	184.4
Sept. 16.....	".....	172	147.64	1.91	1.76	282.35
Oct. 13.....	".....	178	182.25	1.93	1.84	352.28
Nov. 12.....	".....	172	152.85	1.71	1.73	262.08
Dec. 7.....	W. H. Greene.....	190	236.75	0.94	2.59	222.19
Dec. 29.....	".....	168	120.0	0.94	2.23	112.82

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DAILY GAUGE HEIGHT AND DISCHARGE of Oldman River, near Cowley, for 1910.

DAY.	May.		June.		July.		August.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.
1.....			2.48	938	2.08	548	1.58	199
2.....			2.58	1,052	2.08	548	1.58	199
3.....			2.58	1,044	2.08	548	1.58	199
4.....			2.48	920	*1.98	453	1.58	199
5.....			2.48	912	1.98	454	1.58	199
6.....			2.48	908	1.98	454	1.58	199
7.....			2.56	994	1.88	368	1.58	199
8.....			2.58	1,024	1.88	368	1.58	199
9.....			2.48	912	1.88	368	1.58	199
10.....			2.48	916	1.88	368	1.58	199
11.....			2.48	920	1.88	368	1.58	199
12.....			2.48	924	1.78	296	1.58	199
13.....			2.48	928	1.78	296	1.58	199
14.....			2.58	1,052	1.78	296	1.58	199
15.....			2.58	1,058	1.78	296	1.58	199
16.....			2.48	940	1.78	296	1.58	199
17.....			2.48	944	1.78	296	1.58	199
18.....	2.58	1,101	2.48	948	1.78	296	1.58	199
19.....	2.58	1,101	2.48	952	1.78	296	1.58	199
20.....	2.48	980	2.38	842	1.78	296	1.58	199
21.....	2.48	980	2.38	844	1.78	296	1.58	199
22.....	2.58	1,101	2.28	740	1.68	238	1.48	174
23.....	2.68	1,228	2.28	744	1.68	238	1.48	174
24.....	*2.78	1,359	2.28	746	1.68	238	1.48	174
25.....	2.88	1,488	2.28	748	1.68	238	1.48	174
26.....	3.08	1,760	2.18	640	1.68	238	1.48	174
27.....	2.98	1,612	2.18	644	1.68	238	1.48	174
28.....	2.78	1,336	2.08	546	1.58	199	1.48	174
29.....	2.68	1,200	2.08	547	1.58	199	1.48	174
30.....	2.68	1,195	2.08	548	1.58	199	1.48	174
31.....	2.58	1,064	.....	.....	1.58	199	1.48	174

* Changing conditions from May 24th to July 4th. Bolster method used.

DAILY GAUGE HEIGHT AND DISCHARGE of Oldman River, near Cowley, for 1910.—Continued.

DAY.	September.		October.		November.		December.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.
1.....	1.48	174	1.68	238	1.73	264	.....	.....
2.....	1.48	174	1.68	238	1.71	253	.....	.....
3.....	1.48	174	1.68	238	1.71	253	2.35†	.....
4.....	1.48	174	1.68	238	1.72	259	2.18	.....
5.....	1.48	174	1.68	238	1.72	259	2.09	.....
6.....	1.48	174	1.68	238	1.72	259	2.53	.....
7.....	1.68	238	2.28	756	1.71	253	2.55	.....
8.....	1.58	199	2.08	549	1.71	253	2.55	.....
9.....	1.68	238	1.98	454	1.7	247	2.52	.....
10.....	1.68	238	1.88	368	1.7	247	2.44	.....
11.....	1.68	238	1.88	368	1.69	242	2.38	.....
12.....	1.68	238	1.88	368	1.7	247	2.43	.....
13.....	1.68	238	1.88	368	1.7	247	2.43	.....
14.....	1.78	296	1.82	323	1.7	247	2.43	.....
15.....	1.78	296	1.8	309	1.7	247	2.36	.....
16.....	1.78	296	1.8	309	1.7	247	2.34	.....
17.....	1.78	296	1.8	309	1.72	259	2.32	.....
18.....	1.78	296	1.8	309	1.72	259	2.28	.....
19.....	1.78	296	1.78	296	1.74	260	2.25	.....
20.....	1.78	296	1.78	296	1.76	283	2.23	.....
21.....	1.78	296	1.77	289	1.78	296	2.19	.....
22.....	1.68	238	1.76	283	1.8	309	2.18	.....
23.....	1.68	238	1.75	276	1.8	309	2.05	.....
24.....	1.68	238	1.73	264	1.81	316	2.16	.....
25.....	1.68	238	1.84	338	1.82	323	2.18	.....
26.....	1.68	238	1.83	331	1.85	345	1.9	.....
27.....	1.68	238	1.74	260	1.86	341	2.18	.....
28.....	1.68	238	1.78	296	1.86	341	2.2	.....
29.....	1.68	238	1.82	323	*	.....	2.22	.....
30.....	1.68	238	1.79	303	.....	.....	2.21	.....
31.....	.....	.....	1.76	283	.....	.....	2.18	.....

* No observations from Nov. 28 to Dec. 2.
† Ice conditions during December.

MONTHLY DISCHARGE of Oldman River, near Cowley, for 1910.

[Drainage area, 820 square miles.]

MONTH.	DISCHARGE IN SECOND-FEET.				RUN-OFF.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in Inches on Drainage area.	Total in acre-feet.
May (18-31).....	1,760	980	1,250.36	1.52	0.791	34,712
June.....	1,058	546	826.5	1.01	1.13	49,177
July.....	548	199	323.52	0.395	0.455	19,893
August.....	199	174	190.94	0.233	0.269	11,741
September.....	296	174	212.7	0.259	0.289	12,656
October.....	756	238	324.4	0.396	0.457	19,947
November (1-28).....	345	212	273.71	0.334	0.348	15,202
The period.....	.....	.....	.....	.....	.....	163,328

CROWSNEST RIVER, NEAR LUNDBREK.

This gauging station, located on the N.W.¹/₄ Sec. 26, Tp. 7, Rge. 2, W. 5th Mer., at the traffic bridge just north of Lundbrek, was established September 7th, 1907, by P. M. Sauder.

The gauge is a plain staff, graduated to feet and hundredths, placed 20 feet downstream from the bridge and about 6 feet from the water's edge. It is connected with the channel by a ditch which is kept open by the hydrographer on his periodic trips. It is referred to a bench mark on a notch in a tree about 20 yards north of the gauge; elevation 9.74.

The channel is straight for 250 feet above and 1,500 feet below the station. The right bank is high, wooded and will not overflow. The left bank is low, wooded, and liable to overflow in extreme high water. The bed of the stream is of rock, giving a stable cross-section. The current is swift and tumultuous.

Discharge measurements are taken from the bridge, the initial point for soundings being marked, on the lower downstream chord on a line with the face of the left abutment.

There was at first some difficulty in securing a satisfactory observer. On Sept. 16th, 1908, Mr. J. G. Short, mine manager, was appointed to read the gauge and since then the records have been satisfactory. He left Lundbrek at the end of May, 1910, and the gauge has since been read by Mr. C. C. Moore.

DISCHARGE MEASUREMENTS of Crowsnest River, near Lundbrek, in 1907-1908-1909-1910.

Date.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Discharge.
		<i>Feet.</i>	<i>Sq. ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1907						
Sept. 7.....	I. J. Wamsley.....	55	106.0	2.43	2.5	257.1
1908						
July 11.....	H. C. Ritchie.....	64	131.35	4.03	2.717	532.02
Aug. 14.....	".....	53.5	78.9	2.25	1.8	177.3
Aug. 18.....	".....	59	103.9	2.99	2.285	310.82
Sept. 10.....	".....	52	76.42	1.97	1.7	150.5
Sept. 16.....	".....	52	73.87	1.97	1.7	146.04
1909						
Nov. 10.....	A. W. Pae.....	54	71.33	1.92	1.69	137.29
1910						
May 23.....	H. C. Ritchie.....	65	129.6	4.09	2.73	528.62
June 8.....	".....	65.5	133.71	4.12	2.73	549.82
June 15.....	".....	65	121.05	3.864	2.63	467.69
July 2.....	".....	61.5	101.11	3.067	2.24	310.13
July 23.....	".....	58	81.45	2.6	1.94	211.62
Aug. 22.....	".....	54	65.15	1.747	1.60	113.82†
Aug. 22.....	".....	54	65.15	1.78	1.60	116.16‡
Aug. 22.....	".....	54	65.15	1.71	1.60	111.44*
Sept. 14.....	".....	55	68.1	1.69	1.61	114.95
Oct. 11.....	".....	60.8	96.6	2.46	2.15	237.74
Nov. 8.....	".....	58	84.42	2.11	1.89	178.19
Dec. 9.....	W. H. Greene.....	55	95.7	1.487	2.60	142.33
Dec. 31.....	".....	60	72.65	0.806	2.34	58.55

† One point method.
‡ Two point method.
* Three point method.

DAILY GAUGE HEIGHT AND DISCHARGE of Crowsnest River, near Lundbrek, for 1908.

DAY.	September.		October.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....			1.7	142
2.....			1.7	142
3.....			1.7	142
4.....			1.7	142
5.....			1.7	142
6.....			1.7	142
7.....			1.7	142
8.....			1.8	167
9.....			1.7	142
10.....			1.7	142
11.....			1.7	142
12.....			1.7	142
13.....			1.8	167
14.....			1.8	167
15.....			1.8	167
16.....	1.7	142	1.8	167
17.....	1.7	142	1.8	167
18.....	1.8	167	1.8	167
19.....	1.7	142	1.7	142
20.....	1.7	142	1.7	142
21.....	1.7	142	1.7	142
22.....	1.8	167	1.7	142
23.....	1.8	167	1.7	142
24.....	1.8	167	1.7	142
25.....	1.8	167	1.7	142
26.....	1.8	167	1.7	142
27.....	1.7	142	1.7	142
28.....	1.7	142	1.7	142
29.....	1.7	142	1.7	142
30.....	1.7	142	1.8	167
31.....			1.8	167

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DAILY GAUGE HEIGHT AND DISCHARGE of Crowsnest River, near Lundbrek, for 1909.

DAY.	April.		May.		June.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....			1.4	82	4.2	1,545
2.....			1.6	119	4.8	2,035
3.....			2.1	260	5.3	2,395
4.....			3.2	820	5.0	2,215
5.....			2.8	575	4.6	1,860
6.....			2.6	473	4.8	2,035
7.....			2.8	575	4.9	2,125
8.....			3.0	690	4.6	1,860
9.....			2.7	523	4.2	1,545
10.....			2.7	523	3.8	1,245
11.....			2.9	630	3.8	1,245
12.....			2.8	575	4.2	1,545
13.....			2.7	523	4.0	1,395
14.....			2.5	425	4.2	1,545
15.....	1.4	82	2.8	575	3.8	1,245
16.....	1.4	82	2.6	473	3.9	1,320
17.....	1.6	119	2.6	473	3.8	1,245
18.....	2.0	226	2.7	523	3.9	1,320
19.....	2.0	226	2.2	297	3.8	1,245
20.....	2.2	297	2.9	630	3.8	1,245
21.....	2.3	337	3.0	690	3.9	1,320
22.....	2.4	380	3.2	820	3.8	1,245
23.....	2.4	380	3.5	1,025	3.9	1,320
24.....	2.5	425	4.0	1,395	3.8	1,245
25.....	2.3	337	4.4	1,700	3.7	1,170
26.....	2.2	297	4.7	1,945	3.5	1,025
27.....	2.0	226	4.6	1,860	3.4	955
28.....	1.7	142	4.5	1,780	3.2	820
29.....	1.6	119	4.7	1,945	3.0	690
30.....	1.4	82	4.6	1,860	3.1	755
31.....			4.1	1,470		

DAILY GAUGE HEIGHT AND DISCHARGE of Crowsnest River, near Lundbrek, for 1909.—*Con.*

DAY.	July.		August.		September.		October.		November.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.
1.....	3.0	690	3.7	1,170	2.0	226	1.8	167	1.6	119
2.....	2.9	630	2.8	1,245	2.0	226	1.8	167	1.7	142
3.....	2.5	425	2.8	1,245	2.0	226	1.8	167	1.8	167
4.....	2.7	523	2.7	523	2.0	226	1.8	167	1.9	195
5.....	3.0	690	2.7	523	2.0	226	1.8	167	1.9	195
6.....	3.5	1,025	2.7	523	2.0	226	1.8	167	1.9	195
7.....	3.4	955	2.7	523	1.9	195	1.7	142	1.8	167
8.....	3.1	755	2.6	473	1.9	195	1.7	142	1.7	142
9.....	3.0	690	2.6	473	1.9	195	1.7	142	1.7	142
10.....	2.9	630	2.5	425	1.9	195	1.7	142	1.7	142
11.....	2.9	630	2.5	425	1.9	195	1.7	142	1.7	142
12.....	2.8	575	2.4	380	1.9	195	1.7	142	1.8	167
13.....	2.8	575	2.4	380	1.9	195	1.7	142	1.8	167
14.....	2.7	523	2.8	575	1.9	195	1.7	142	1.8	167
15.....	2.6	473	2.4	380	1.9	195	1.7	142	1.8	167
16.....	2.6	473	2.3	337	1.8	167	1.7	142	1.8	167
17.....	2.6	473	2.2	297	1.8	167	1.7	142	2.0	226
18.....	2.6	473	2.2	297	1.8	167	1.7	142	1.9	195
19.....	2.5	425	2.2	297	1.8	167	1.7	142	1.8	167
20.....	2.5	425	2.2	297	1.8	167	1.7	142	1.8	167
21.....	2.5	425	2.1	260	1.8	167	1.7	142	1.8	167
22.....	2.4	380	2.1	260	1.8	167	1.7	142	1.8	167
23.....	2.4	380	2.1	260	1.8	167	1.7	142	1.8	167
24.....	2.4	380	2.1	260	1.8	167	1.7	142	1.8	167
25.....	2.5	425	2.1	260	1.8	167	1.8	167	1.9	195
26.....	3.9	1,320	2.1	260	1.8	167	1.9	119	1.9	195
27.....	4.7	1,945	2.1	260	1.8	167	1.6	119	1.8	167
28.....	5.5	2,665	2.1	260	1.8	167	1.6	119	1.8	167
29.....	4.6	1,860	2.1	260	1.8	167	1.6	119	2.0	226
30.....	4.0	1,395	2.0	226	1.8	167	1.6	119	2.2	297
31.....	3.6	1,095	2.0	226	1.6	119

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DAILY GAUGE HEIGHT AND DISCHARGE of Crowsnest River, near Lundbrek, for 1910.

DAY.	April.		May.		June.		July.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	1.83	175	2.83	591	2.73	539	2.33	350
2.....	1.83	175	2.73	539	2.73	539	2.33	350
3.....	1.83	175	2.53	439	2.63	488	2.23	309
4.....	1.83	175	2.53	439	2.63	488	2.23	309
5.....	1.83	175	2.53	439	2.53	439	2.23	309
6.....	2.13	271	2.73	539	2.53	439	2.23	309
7.....	2.23	309	2.73	539	2.73	539	2.23	309
8.....	2.13	271	3.03	709	2.73	539	2.23	309
9.....	2.23	309	3.03	709	2.63	488	2.13	271
10.....	2.23	309	3.03	709	2.63	488	2.13	271
11.....	2.23	309	2.93	648	2.63	488	2.13	271
12.....	2.43	393	2.83	591	2.73	539	2.13	271
13.....	2.53	439	2.73	539	2.73	539	2.13	271
14.....	2.33	350	2.73	539	2.63	488	2.13	271
15.....	2.33	350	2.83	591	2.63	488	2.03	236
16.....	2.33	350	2.73	539	2.63	488	2.03	236
17.....	2.33	350	2.63	488	2.63	488	2.03	236
18.....	2.33	350	2.73	539	2.53	439	2.03	236
19.....	2.63	488	2.83	591	2.53	439	2.03	236
20.....	2.83	591	2.83	591	2.53	439	2.03	236
21.....	2.83	591	2.83	591	2.53	439	1.93	204
22.....	2.83	591	2.83	591	2.43	393	1.93	204
23.....	2.73	539	2.73	539	2.43	393	1.93	204
24.....	2.83	591	2.83	591	2.33	350	1.83	175
25.....	2.93	648	2.83	591	2.33	350	1.83	175
26.....	3.13	774	3.03	709	2.33	350	1.83	175
27.....	3.23	839	3.03	709	2.33	350	1.83	175
28.....	3.23	839	3.03	709	2.33	350	1.83	175
29.....	3.23	839	2.93	648	2.33	350	1.83	175
30.....	3.13	774	2.73	539	2.33	350	1.83	175
31.....			2.73	539	.....	.....	1.83	175

DAILY GAUGE HEIGHT AND DISCHARGE of Crowsnest River, near Lundbrek, for 1910.—*Con.*

DAY.	August.		September.		October.		November.		December.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	1.83	175	1.63	129	1.73	149	1.91	198	.....	.....
2.....	1.83	175	1.63	129	1.75	154	1.86	184	.....	.....
3.....	1.83	175	1.53	105	1.75	154	1.87	187	*	.....
4.....	1.73	149	1.53	105	1.96	214	1.85	181	2.63	.....
5.....	1.73	149	1.53	105	1.94	207	1.83	175	2.66	.....
6.....	1.73	149	1.63	126	1.93	204	1.81	170	2.73	.....
7.....	1.73	149	1.63	126	1.93	204	1.81	170	2.74	.....
8.....	1.73	149	1.63	126	2.15	278	1.87	187	2.68	.....
9.....	1.73	149	1.63	126	2.14	275	1.89	192	2.61	.....
10.....	1.73	149	1.63	126	2.25	317	1.86	184	2.62	.....
11.....	1.73	149	1.63	126	2.15	278	1.93	204	2.57	.....
12.....	1.73	149	1.63	126	2.13	271	2.23	309	2.58	.....
13.....	1.73	149	1.63	126	2.03	236	1.98	220	2.53	.....
14.....	1.73	149	1.63	126	2.03	236	1.93	204	2.43	.....
15.....	1.73	149	1.63	126	2.03	236	1.93	204	2.38	.....
16.....	1.73	149	1.63	126	1.93	204	1.91	198	2.36	.....
17.....	1.73	149	1.63	126	1.93	204	1.88	189	2.36	.....
18.....	1.63	126	1.73	149	1.93	204	1.98	220	2.36	.....
19.....	1.63	126	1.73	149	1.93	204	1.78	162	2.36	.....
20.....	1.63	126	1.73	149	1.83	175	1.78	162	2.02	.....
21.....	1.63	126	1.73	149	1.83	175	1.78	162	1.95	.....
22.....	1.63	126	1.73	149	1.83	175	1.78	162	1.97	.....
23.....	1.63	126	1.73	149	1.83	175	1.78	162	1.98	.....
24.....	1.63	126	1.73	149	1.83	175	1.78	162	2.92	.....
25.....	1.63	126	1.73	149	2.13	271	1.81	170	2.53	.....
26.....	1.63	126	1.73	149	2.13	271	1.81	170	2.58	.....
27.....	1.53	105	1.73	149	2.13	271	†	.....	2.50	.....
28.....	1.53	105	1.73	149	2.13	271	.....	.....	2.48	.....
29.....	1.53	105	1.73	149	1.93	204	.....	.....	2.61	.....
30.....	1.53	105	1.73	149	1.91	198	.....	.....	2.59	.....
31.....	1.53	105	.....	.....	1.91	198	.....	.....	2.38	.....

* Ice conditions during December.
† No observations from Nov. 27 to Dec. 3.

MONTHLY DISCHARGE of Crowsnest River, near Lundbrek, for 1908-1909-1910.

[Drainage area, 263 square miles.]

MONTH.	DISCHARGE IN SECOND-FEET.				RUN-OFF.	
	Maximum.	Minimum.	Mean	Per square mile.	Depth in Inches on Drainage area.	Total in acre-feet.
1908						
September (16-30).....	167	142	152	0.578	0.322	4,522
October.....	167	142	149	0.568	0.654	9,178
The period.....						13,700
1909						
April (15-30).....	425	82	235	0.893	0.531	7,453
May.....	1,945	82	847	3.22	3.71	52,074
June.....	2,395	690	1,425	5.42	6.05	84,803
July.....	2,665	380	785	2.98	3.44	48,316
August.....	1,245	226	439	1.67	1.92	26,936
September.....	226	167	187	0.712	0.794	11,139
October.....	167	119	143	0.544	0.627	8,805
November.....	297	142	175	0.666	0.743	10,419
The period.....						249,945
1910						
April.....	839	175	445	1.69	1.89	26,457
May.....	709	439	583	2.22	2.55	35,829
June.....	539	350	450	1.71	1.91	26,767
July.....	350	175	245	0.933	1.07	15,090
August.....	175	105	138	0.523	0.603	8,469
September.....	149	105	134	0.510	0.569	7,978
October.....	278	149	219	0.833	0.96	13,463
November (1-26).....	309	162	188	0.715	0.69	9,697
The period.....						143,750

CROWSNEST RIVER, NEAR FRANK.

This gauging station, located at the traffic bridge on Sec. 36, Tp. 7, Rge. 4, W.5th Mer., was established on July 28th, 1910, by H. C. Ritchie.

The gauge consists of a plain staff, graduated to feet, tenths and hundredths, placed at the left bank about 20 feet down stream from the bridge. It is referenced by a bench mark, on spikes driven into a tree stump within three feet of gauge; elevation 9.43.

The channel is straight for about 200 feet above the station and for 500 feet below, both banks being high, wooded and not liable to overflow. The bed of the stream is clean gravel.

The discharge measurements are taken from the bridge during high water stages, the points for soundings being marked on the lower chord. In low stages the river is waded at the same section.

The gauge was read daily during the season of 1910 by Chas. Richardson.

DISCHARGE MEASUREMENTS of Crowsnest River, near Frank, in 1910.

Date.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Dis-charge.
		Feet.	Sq. ft.	Ft. per sec.	Feet.	Sec.-ft.
June 13.....	H. C. Ritchie.....	69	116.77	3.8	.....	444.15
July 20.....	".....	61.8	70.87	2.447	.....	173.45
July 29.....	".....	60	62.4	2.126	4.28	132.69
Aug. 16.....	".....	59	59.35	1.82	4.19	107.88
Sept. 10.....	".....	54	49.75	1.57	4.1	78.31
Oct. 17.....	".....	62	68.3	2.36	4.39	161.37
Nov. 4.....	".....	60	60.89	1.97	4.27	119.74
Dec. 10.....	".....	54	51.07	1.62	4.07	82.76

DAILY GAUGE HEIGHT AND DISCHARGE of Crowsnest River, near Frank, for 1910.

DAY.	July.		August.		September.		October.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....			4.3	134	4.2	105	4.4	164
2.....			4.3	134	4.2	105	4.4	164
3.....			4.3	134	4.2	105	4.5	196
4.....			4.3	134	4.1	78	4.5	196
5.....			4.2	105	4.1	78	4.6	230
6.....			4.2	105	4.1	78	4.6	230
7.....			4.2	105	4.1	78	4.7	265
8.....			4.2	105	4.1	78	4.7	265
9.....			4.2	105	4.1	78	4.7	265
10.....			4.2	105	4.1	78	4.7	265
11.....			4.2	105	4.1	78	4.7	265
12.....			4.2	105	4.2	105	4.6	230
13.....			4.2	105	4.2	105	4.6	230
14.....			4.2	105	4.2	105	4.6	230
15.....			4.2	105	4.2	105	4.5	196
16.....			4.2	105	4.2	105	4.5	196
17.....			4.2	105	4.3	134	4.4	164
18.....			4.2	105	4.3	134	4.4	164
19.....			4.2	105	4.3	134	4.4	164
20.....			4.2	105	4.3	134	4.4	164
21.....			4.2	105	4.3	134	4.4	164
22.....			4.2	105	4.3	134	4.4	164
23.....			4.2	105	4.3	134	4.4	164
24.....			4.2	105	4.3	134	4.4	164
25.....			4.2	105	4.3	134	4.6	230
26.....			4.2	105	4.3	134	4.7	265
27.....			4.2	105	4.3	134	4.68	258
28.....			4.2	105	4.3	134	4.67	254
29.....	4.3	134	4.2	105	4.3	134	4.62	237
30.....	4.3	134	4.2	105	4.4	164	4.53	206
31.....	4.3	134	4.2	105	.....	.....	4.42	170

MONTHLY DISCHARGE of Crowsnest River, near Frank, for 1910.

[Drainage area, 170 square miles.]

MONTH.	DISCHARGE IN SECOND-FEET.				RUN-OFF.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in Inches on Drainage area.	Total in acre-feet.
July (29-31).....	134	134	134	0.790	0.088	797
August.....	134	105	108.7	0.639	0.737	6,684
September.....	164	78	112.3	0.661	0.738	6,682
October.....	265	164	210.3	1.24	1.43	12,931
The period.....						27,094

CROWSNEST RIVER, NEAR COLEMAN.

This gauging station, located on the S.W. $\frac{1}{4}$ Sec. 12, Tp. 8, Rge. 5, W. 5th Mer., at a private bridge about $2\frac{1}{2}$ miles west of Coleman, was established July 28th. 1910, by H. C. Ritchie.

The gauge is a plain staff, graduated to feet and hundredths, placed at the left bank about 150 feet upstream from the bridge. It is referred to a bench mark on top of a post 30 feet west of the gauge; elevation 10.16.

The channel is straight for 30 feet above and 300 feet below the station. Both banks are high, wooded, and will not overflow. The bed of the stream is of sand and gravel. The current is fairly swift.

Discharge measurements are made from the bridge during high water stages, the initial point for soundings being on line with the face of the left abutment. In low stages the stream is waded $\frac{3}{4}$ mile downstream from the bridge.

The gauge was read daily by Prudent LeGal, whose house is about 40 feet away.

SESSIONAL PAPER No. 25d

DISCHARGE MEASUREMENTS of Crowsnest River, near Coleman, in 1910.

Date.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Dis-charge.
		<i>Feet.</i>	<i>Sq. ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
June 13.....	H. C. Ritchie.....	31.5	94.15	3.59	.....	338.35
July 28.....	".....	34	69.7	1.84	4.7	128.38
Aug. 17.....	".....	35	67.7	1.4	4.44	94.67
Sept. 12.....	".....	29	61.95	1.2	4.3	74.34
Oct. 19.....	".....	31	67.15	1.63	4.74	109.17
Nov. 4.....	".....	30	63.15	1.18	4.45	74.75

DAILY GAUGE HEIGHT AND DISCHARGE of Crowsnest River, near Coleman, for 1910.

DAY.	July.		August.		September.		October.		November.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....			4.70	128	4.30	74	4.50	98	4.52	82
2.....			4.60	112	4.30	74	4.70	128	4.61	92
3.....			4.60	112	4.30	74	4.90	164	4.52	82
4.....			4.60	112	4.30	74	4.80	142	4.51	81
5.....			4.60	112	4.30	74	4.80	141	4.53	83
6.....			4.60	112	4.30	74	4.70	122		
7.....			4.60	112	4.30	74	4.70	120		
8.....			4.60	112	4.30	74	4.90	154		
9.....			4.60	112	4.30	74	4.90	152		
10.....			4.50	98	4.30	74	5.10	192		
11.....			4.50	98	4.30	74	4.90	148		
12.....			4.50	98	4.30	74	5.00	166		
13.....			4.50	98	4.30	74	4.90	144		
14.....			4.50	98	4.30	74	4.90	142		
15.....			4.50	98	4.30	74	4.80	123		
16.....			4.50	98	4.30	74	4.80	122		
17.....			4.50	98	4.60	112	4.80	120		
18.....			4.50	98	4.70	128	4.70	103		
19.....			4.50	98	4.80	146	4.74	109		
20.....			4.40	85	4.70	128	4.72	106		
21.....			4.40	85	4.70	128	4.63	95		
22.....			4.40	85	4.70	128	4.56	87		
23.....			4.40	85	4.60	112	4.50	80		
24.....			4.40	85	4.60	112	4.46	76		
25.....			4.40	85	4.60	112	4.54	84		
26.....			4.40	85	4.50	98	4.62	93		
27.....			4.40	85	4.50	98	4.72	106		
28.....	4.70	128	4.30	74	4.50	98	4.64	96		
29.....	4.70	128	4.30	74	4.40	85	4.62	93		
30.....	4.70	128	4.30	74	4.50	98	4.50	80		
31.....	4.70	128	4.30	74			4.46	76		

Changing conditions from Oct. 2nd to Oct. 18th. Bolster method applied.

MONTHLY DISCHARGE of Crowsnest River, near Coleman, for 1910.

[Drainage area, 68 square miles.]

MONTH.	DISCHARGE IN SECOND-FEET.				RUN-OFF.	
	Maximum.	Minimum.	Mean	Per square mile.	Depth in Inches on Drainage area.	Total in acre-feet.
July (28-31).....	128	128	128	1.88	0.279	1,015
August.....	128	74	96.1	1.41	1.63	5,909
September.....	146	74	92.2	1.36	1.52	5,486
October.....	192	76	118.1	1.74	2.00	7,262
November (1-5).....	92	81	84	1.23	0.229	833
The period.....						20,505

TODD CREEK AT ELTON'S RANCHE.

This station was established by H. C. Ritchie, August 3rd, 1909. It is located 7 miles north-west of Cowley, at a private footbridge about 20 feet from Cecil Elton's house on the S.W.¹/₄ Sec. 19, Tp. 8, Rge. 1, W. 5th Mer.

The gauge is a plain staff, graduated to feet and hundredths, driven into the bed of the stream and securely braced to the left bank. It is referred to the top of a stake about 10 feet east; elevation 6.70 above the zero mark of the gauge. It is read by Cecil Elton.

The channel is straight for about 55 feet above and 60 feet below the gauge. The right bank is high and wooded and liable to overflow in extreme high water. The left bank is wooded and liable to overflow for about 5 feet from edge, when it rises abruptly to about 6 feet. The bed lies in one channel and is composed of clean sand and gravel. The current is inclined to be swift at high stages, but quite sluggish at low.

Cecil Elton and Capt. Cardwell have irrigation ditches which divert water at points above this gauging station. Mr. Elton irrigates about 35 acres, and Capt. Cardwell about 90.

DISCHARGE MEASUREMENTS of Todd Creek at Elton's Ranche, in 1910.

Date.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Dis-charge.
		<i>Feet.</i>	<i>Sq. ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
May 25.....	H. C. Ritchie.....	20.5	32.68	0.78	2.75	25.54
June 9.....	".....	21	32.19	0.77	3.02	24.81
July 5.....	".....	11	4.56	1.8	2.66	8.23†
July 5.....	".....	21	25.54	0.25	2.66	6.38
July 26.....	".....	4.6	1.452	0.97	2.45	1.41†
Aug. 20.....	".....	4.6	1.08	0.76	2.4	0.82†
Sept. 15.....	".....	4.9	1.86	1.51	2.55	2.81†
Sept. 15.....	".....	20.8	21.11	0.13	2.55	2.74
Oct. 12.....	".....	4.9	2.18	1.5	2.55	3.27†

† Measurements taken at wading stations near regular station.

DAILY GAUGE HEIGHT AND DISCHARGE of Todd Creek at Elton's Ranche, for 1910.

DAY.	April.		May.		June.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	2.75	7.9	2.91	15.0	2.97	18.4
2.....	2.75	7.9	2.9	14.5	2.98	19.0
3.....	2.79	9.4	2.89	14.0	2.97	18.4
4.....	2.84	11.6	2.88	13.5	2.97	17.4
5.....	2.8	9.8	2.88	13.5	2.95	17.2
6.....	2.82	10.7	2.85	12.0	2.93	16.1
7.....	2.85	12.0	2.87	13.0	2.92	15.6
8.....	2.81	10.2	2.86	12.5	2.94	16.7
9.....	2.78	9.0	2.87	13.0	2.99	19.6
10.....	2.78	9.0	2.93	16.1	2.94	16.7
11.....	2.8	9.8	3.0	20.2	2.89	14.0
12.....	2.81	10.2	3.1	27.0	2.88	13.5
13.....	2.81	10.2	3.09	26.3	2.86	12.5
14.....	2.8	9.8	3.1	27.0	2.85	12.0
15.....	2.8	9.8	3.07	24.9	2.85	12.0
16.....	2.79	9.4	3.07	24.9	2.73	7.3
17.....	2.79	9.4	3.01	20.9	2.73	7.3
18.....	2.79	9.4	3.0	20.2	2.72	7.0
19.....	2.79	9.4	3.15	30.5	2.71	6.7
20.....	2.79	9.4	3.06	24.2	2.71	6.7
21.....	2.78	9.0	3.02	21.5	2.7	6.4
22.....	2.78	9.0	3.01	20.9	2.71	6.7
23.....	2.78	9.0	3.0	20.2	2.71	6.7
24.....	2.78	9.0	3.01	20.9	2.64	4.9
25.....	2.79	9.4	3.05	23.5	2.62	4.4
26.....	2.8	9.8	3.0	20.2	2.61	4.2
27.....	2.81	10.2	2.8	9.8	2.61	4.2
28.....	2.81	10.2	2.98	19.0	2.6	4.0
29.....	2.84	11.6	2.96	17.8	2.66	5.3
30.....	2.89	14.0	2.97	18.4	2.66	5.3
31.....			2.97	18.4		

DAILY GAUGE HEIGHT AND DISCHARGE of Todd Creek at Elton's Ranche, for 1910.—Continued.

DAY.	July.		August.		September.		October.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.
1.....	2.67	5.6	2.52	2.5	2.57	3.4	2.53	2.6
2.....	2.67	5.6	2.48	1.8	2.56	3.2	2.54	2.8
3.....	2.68	5.9	2.45	1.4	2.55	3.0	2.53	2.6
4.....	2.67	5.6	2.45	1.4	2.55	3.0	2.54	2.8
5.....	2.68	5.9	2.46	1.5	2.53	2.6	2.57	3.4
6.....	2.64	4.9	2.51	2.3	2.54	2.8	2.57	3.4
7.....	2.61	4.2	2.55	3.0	2.57	3.4	2.56	3.2
8.....	2.6	4.0	2.54	2.8	2.63	4.7	2.63	4.7
9.....	2.63	4.7	2.48	1.8	2.61	4.2	2.58	3.6
10.....	2.63	4.7	2.5	2.1	2.61	4.2	2.58	3.6
11.....	2.67	5.6	2.51	2.3	2.58	3.6	2.57	3.4
12.....	2.65	5.1	2.48	1.8	2.57	3.4	2.55	3.0
13.....	2.64	4.9	2.47	1.7	2.55	3.0	2.54	2.8
14.....	2.6	4.0	2.48	1.8	2.56	3.2	2.54	2.8
15.....	2.58	3.6	2.52	2.5	2.55	3.0	2.54	2.8
16.....	2.59	3.8	2.56	3.2	2.55	3.0	2.54	2.8
17.....	2.59	3.8	2.57	3.4	2.54	2.8	2.54	2.8
18.....	2.56	3.2	2.54	2.8	2.53	2.6	2.55	3.0
19.....	2.57	3.4	2.43	1.1	2.52	2.5	2.56	3.2
20.....	2.54	2.8	2.4	0.8	2.53	2.6	2.56	3.2
21.....	2.53	2.6	2.39	0.7	2.54	2.8	2.55	3.0
22.....	2.53	2.6	2.42	1.0	2.55	3.0	2.54	2.8
23.....	2.5	2.1	2.47	1.7	2.56	3.2	2.55	3.0
24.....	2.48	1.8	2.54	2.8	2.58	3.6	2.55	3.0
25.....	2.47	1.7	2.52	2.5	2.57	3.4	2.58	3.6
26.....	2.46	1.5	2.52	2.5	2.54	2.8	2.64	4.9
27.....	2.47	1.7	2.51	2.3	2.55	3.0	2.56	3.2
28.....	2.47	1.7	2.5	2.1	2.54	2.8	2.57	3.4
29.....	2.49	2.0	2.52	2.5	2.55	3.0	2.65	5.1
30.....	2.53	2.6	2.52	2.5	2.54	2.8	2.63	4.7
31.....	2.52	2.5	2.53	2.6	.....	.....	2.61	4.2

MONTHLY DISCHARGE of Todd Creek at Elton's Ranche, for 1910.

[Drainage area, 62 square miles.]

MONTH.	DISCHARGE IN SECOND-FEET.				RUN-OFF.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in Inches on Drainage area.	Total in acre-feet.
April.....	14.0	7.9	9.85	0.159	0.177	586
May.....	30.5	9.8	19.15	0.309	0.356	1,178
June.....	19.6	4.0	10.91	0.176	0.196	649
July.....	5.9	1.5	3.7	0.06	0.069	228
August.....	3.4	0.7	2.1	0.034	0.039	129
September.....	4.7	2.5	3.15	0.051	0.057	187
October.....	5.1	2.6	3.34	0.054	0.062	205
The period.....						3,162

COW CREEK AT ROSS' RANCHE.

A gauging station, located on Sec. 12, Tp. 8, Rge. 2, W. 5th Mer., on Abel Brux's farm, was established August 2nd, 1909, by H. C. Ritchie. In the spring of 1910, Mr Brux moved away and, as no other observer was available, Mr. Ritchie established a new station at John Ross' ranche on the N.E. $\frac{1}{4}$ Sec. 14, Tp. 8, Rge. 2, W. 5th Mer., on May 26th, 1910.

The gauge is a plain staff, graduated to feet and hundredths, placed at the right bank. It is referred to a bench mark on the east side of the step at the door on the south side of John Ross' stable; elevation 13.71.

The channel is straight for 25 feet above and 40 feet below the station. Both banks are high, wooded, and not liable to overflow. The bed is of clean sand and gravel.

Discharge measurements are taken from a private bridge during high water stages, the initial point for soundings being on the left bank. In low water the creek is waded.

The gauge was read daily by Mr. John Ross.

DISCHARGE MEASUREMENTS of Cow Creek at Ross' Ranche, in 1910.

Date.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Dis-charge.
		<i>Feet.</i>	<i>Sq. ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
May 26.....	H. C. Ritchie.....	9.5	8.28	0.727	2.00	6.02
June 9.....	".....	10	8.57	0.75	1.98	6.43
July 5.....	".....	9	4.92	0.29	1.71	1.43
July 26.....	".....	2.6	0.64	0.87	1.55	0.56*
Aug. 20.....	".....	1.8	0.23	0.62	1.43	0.14*
Sept. 15.....	".....				1.59	0.72†
Sept. 15.....	".....	2.6	0.6	1.27	1.59	0.76*
Oct. 12.....	".....	2.7	0.71	1.34	1.63	0.95*

* Measurements taken at wading stations near regular station.
† Discharge determined by using 15-inch weir.

DAILY GAUGE HEIGHT AND DISCHARGE of Cow Creek at Ross' Ranche, for 1910.

DAY.	May.		June.		July.		August.		September.		October.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....			2.0	6.2	1.7	1.35	1.55	0.55	1.52	0.43	1.63	0.95
2.....			2.0	6.2	1.7	1.35	1.55	0.55	1.52	0.43	1.64	1.0
3.....			2.0	6.2	1.7	1.35	1.55	0.55	1.5	0.35	1.64	1.0
4.....			2.0	6.2	1.7	1.35	1.55	0.55	1.5	0.35	1.65	1.05
5.....			1.9	4.1	1.7	1.35	1.57	0.65	1.47	0.26	1.65	1.05
6.....			1.9	4.1	1.7	1.35	1.57	0.65	1.45	0.2	1.65	1.05
7.....			1.9	4.1	1.7	1.35	1.57	0.65	1.45	0.2	1.65	1.05
8.....			2.0	6.2	1.7	1.35	1.57	0.65	1.55	0.55	1.65	1.05
9.....			2.0	6.2	1.7	1.35	1.57	0.65	1.6	0.8	1.65	1.05
10.....			2.0	6.2	1.7	1.35	1.57	0.65	1.62	0.9	1.65	1.05
11.....			1.9	4.1	1.7	1.35	1.55	0.55	1.62	0.9	1.63	0.95
12.....			1.9	4.1	1.7	1.35	1.52	0.43	1.6	0.8	1.60	0.8
13.....			1.9	4.1	1.6	0.8	1.5	0.35	1.6	0.8	1.60	0.8
14.....			1.9	4.1	1.6	0.8	1.47	0.26	1.6	0.8	1.63	0.95
15.....			1.9	4.1	1.6	0.8	1.45	0.2	1.6	0.8	1.63	0.95
16.....			1.8	2.45	1.6	0.8	1.45	0.2	1.58	0.7	1.63	0.95
17.....			1.8	2.45	1.6	0.8	1.45	0.2	1.58	0.7	1.63	0.95
18.....			1.8	2.45	1.6	0.8	1.43	0.16	1.57	0.65	1.63	0.95
19.....			1.8	2.45	1.6	0.8	1.4	0.1	1.55	0.55	1.65	1.05
20.....			1.8	2.45	1.6	0.8	1.4	0.1	1.55	0.55	1.65	1.05
21.....			1.8	2.45	1.6	0.8	1.4	0.1	1.55	0.55	1.65	1.05
22.....			1.8	2.45	1.6	0.8	1.4	0.1	1.55	0.55	1.65	1.05
23.....			1.8	2.45	1.6	0.8	1.4	0.1	1.57	0.65	1.65	1.05
24.....			1.8	2.45	1.6	0.8	1.45	0.2	1.6	0.8	1.65	1.05
25.....			1.8	2.45	1.55	0.55	1.47	0.26	1.63	0.95	1.65	1.05
26.....	2.0	6.2	1.8	2.45	1.55	0.55	1.47	0.26	1.63	0.95	1.65	1.05
27.....	2.0	6.2	1.8	2.45	1.55	0.55	1.47	0.26	1.63	0.95	1.65	1.05
28.....	2.0	6.2	1.8	2.45	1.55	0.55	1.47	0.26	1.63	0.95	1.65	1.05
29.....	2.1	8.6	1.8	2.45	1.55	0.55	1.47	0.26	1.63	0.95	1.65	1.05
30.....	2.0	6.2	1.7	1.35	1.55	0.55	1.47	0.26	1.63	0.95	1.65	1.05
31.....	2.0	6.2			1.55	0.55	1.5	0.35			1.65	1.05

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MONTHLY DISCHARGE of Cow Creek at Ross' Ranche, for 1910.

[Drainage area, 28 square miles.]

MONTH.	DISCHARGE IN SECOND-FOOT.			RUN-OFF.		
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in Inches on Drainage area.	Total in acre-feet.
May (26-31).....	8.60	6.20	6.60	0.236	0.056	78
June.....	6.20	1.35	3.73	0.133	0.148	222
July.....	1.35	0.55	0.956	0.034	0.039	58
August.....	0.65	0.1	0.357	0.013	0.015	22
September.....	0.95	0.2	0.665	0.024	0.027	39
October.....	1.05	0.8	1.01	0.036	0.041	62
The period.....						481

CONNELY CREEK NEAR LUNDBREK.

This station was established July 31st, 1909, by H. C. Ritchie. It is located at a footbridge on the trail in S.E.¼ Sec. 36, Tp. 7, Rge. 2, W. 5th Mer., and about 100 feet from the mouth of the creek.

This stream has a very crooked channel, it being very difficult to find a suitable place for gauging. For about 20 feet below and above the gauge, the channel is practically straight. The right bank is low and liable to overflow at high stages of the stream; the left bank is comparatively high. Both banks are thickly wooded near the water's edge. The bed is composed of sand and gravel, and is free from vegetation.

During high stages, discharge measurements are made from the foot bridge; the initial point for soundings being a stake on the right bank. During low stages, the current at this point is too sluggish for accurate results and a wading section about 200 feet upstream, is used.

As Mr. N. V. Holway, who read the gauge in 1909, was not available, the gauge was not read during 1910.

DISCHARGE MEASUREMENTS of Connely Creek, near Lundbrek, in 1910.

Date.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Dis-charge.
		<i>Feet.</i>	<i>Sq. ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
May 23.....	H. C. Ritchie.....	12.3	6.88	0.38	2.46	2.63
June 8.....	".....	12.5	7.27	0.41	2.45	2.97
July 2.....	".....	3.7	0.52	0.807	2.33	0.42
July 23.....	".....					Dry*
Oct. 12.....	".....				2.36	0.27†

* Creek dry.
† Discharge determined by using 15-inch weir.

SOUTHFORK RIVER, NEAR COWLEY.

This gauging station, located at the traffic bridge between Cowley and Pincher on the S.E.¼ Sec. 2, Tp. 7, Rge. 1, W. 5th Mer., was established by H. C. Ritchie on August 5th, 1909.

The gauge is a plain staff, graduated to feet and hundredths. It was first fastened to the second pier of the bridge from the left bank, but, owing to this section changing during floods, was moved to a point about half a mile downstream and securely fastened by braces to supports on the bank. In its present position it is about five minutes walk from Mr. G. W. Buchanan's house, who reads it daily. It is referenced by a bench mark on a tree within 20 feet; elevation 8.33.

Above the bridge an island divides the river into two channels, this island being submerged during high water stages. These two channels join about fifty feet upstream from the section, but the stream is again divided into three by the piers of the bridge. Owing to the protection of the piers gravel bars are formed downstream from the section.

The bed of the river is quite rough requiring extreme care in determining the area of the section. The current is swift except through the east channel during low stages when it becomes dead.

Discharge measurements are taken from the downstream side of the bridge at both high and low water, the initial point for sounding being marked on the superstructure in line with the face of the abutment on the left bank.

DISCHARGE MEASUREMENTS of Southfork River, near Cowley, in 1910.

Date.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Dis-charge.
		<i>Feet.</i>	<i>Sq. ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
May 27.....	H. C. Ritchie.....	228	514.53	4.425	4.25	2,277.1
June 10.....	".....	208	377.75	3.697	3.6	1,396.56
June 18.....	".....	207.5	358.0	3.6	3.53	1,289.02
July 8.....	".....	110.5	241.29	2.45	2.84	591.11
July 25.....	".....	97	185.0	1.607	2.46	298.25
Aug. 19.....	".....	65	76.07	2.32	2.18	176.48
Sept. 13.....	".....	95	166.87	1.54	2.34	256.66
Sept. 20.....	".....	108	225.69	2.29	2.8	516.98
Oct. 10.....	".....	199	312.8	3.1	3.33	969.64
Nov. 7.....	".....	102	209.24	2.0	2.65	418.01
Dec. 30.....	W. H. Greene.....	80.5	64.4	1.62	2.815	104.33*

* Ice conditions.

DAILY GAUGE HEIGHT AND DISCHARGE of Southfork River, near Cowley, for 1910.

DAY.	April.		May.		June.		July.		August.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	2.5	345	3.9	1,760	4.2	2,250	3.2	880	2.3	240
2.....	2.5	345	3.7	1,470	4.2	2,250	3.1	785	2.3	240
3.....	2.5	345	3.6	1,340	4.1	2,080	3.1	785	2.3	240
4.....	2.5	345	3.5	1,215	3.9	1,760	3.1	785	2.3	240
5.....	2.5	345	3.5	1,215	3.7	1,470	3.0	695	2.3	240
6.....	2.6	400	3.6	1,340	3.7	1,470	3.0	695	2.3	240
7.....	2.7	465	3.9	1,760	3.8	1,610	2.9	610	2.3	240
8.....	2.7	465	4.4	2,605	3.8	1,610	2.8	530	2.3	240
9.....	2.9	610	4.4	2,605	3.8	1,610	2.8	530	2.3	240
10.....	2.9	610	4.2	2,250	3.6	1,340	2.8	530	2.3	240
11.....	2.9	610	4.0	1,915	3.8	1,610	2.8	530	2.2	195
12.....	3.0	695	4.0	1,915	4.0	1,915	2.8	530	2.2	195
13.....	3.1	785	3.9	1,760	4.0	1,915	2.8	530	2.2	195
14.....	3.1	785	3.9	1,760	3.9	1,760	2.8	530	2.2	195
15.....	3.1	785	3.9	1,760	3.8	1,610	2.7	465	2.2	195
16.....	3.1	785	3.8	1,610	3.7	1,470	2.7	465	2.2	195
17.....	3.2	880	3.8	1,610	3.6	1,340	2.7	465	2.2	195
18.....	3.3	985	3.8	1,610	3.6	1,340	2.7	465	2.2	195
19.....	3.4	1,095	4.0	1,915	3.6	1,340	2.7	465	2.2	195
20.....	3.8	1,610	3.9	1,760	3.5	1,215	2.7	465	2.2	195
21.....	3.8	1,610	3.9	1,760	3.4	1,095	2.6	400	2.2	195
22.....	3.8	1,610	3.9	1,760	3.3	985	2.6	400	2.2	195
23.....	3.7	1,470	4.1	2,080	3.3	985	2.6	400	2.2	195
24.....	3.8	1,610	4.2	2,250	3.3	985	2.5	345	2.2	195
25.....	4.0	1,915	4.3	2,425	3.2	880	2.5	345	2.2	195
26.....	4.4	2,605	4.5	2,790	3.3	985	2.5	345	2.2	195
27.....	4.3	2,425	4.3	2,425	3.3	985	2.5	345	2.2	195
28.....	4.3	2,425	4.2	2,250	3.3	985	2.4	290	2.1	155
29.....	4.3	2,425	4.1	2,080	3.2	880	2.4	290	2.1	155
30.....	4.1	2,080	4.1	2,080	3.2	880	2.4	290	2.1	155
31.....			4.1	2,080			2.3	240	2.1	155

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DAILY GAUGE HEIGHT AND DISCHARGE of Southfork River, near Cowley, for 1910.—Continued.

DAY	September.		October.		November.		December.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.
1.....	2.1	155	2.8	530	†			
2.....	2.1	155	3.0	695				
3.....	2.1	155	3.1	785				
4.....	2.1	155	3.2	880				
5.....	2.1	155	3.1	785				
6.....	2.2	195	3.1	785				
7.....	2.3	240	3.2	880				
8.....	2.3	240	3.4	1,095			* †	
9.....	2.3	240	3.44	1,145			3.38	
10.....	2.3	240	3.33	1,018			3.36	
11.....	2.4	290	3.27	953			3.3	
12.....	2.3	240	3.2	880			3.34	
13.....	2.3	240	3.2	880			3.27	
14.....	2.3	240	3.02	713			3.05	
15.....	2.4	290	3.08	767			3.05	
16.....	2.6	400	3.03	733			3.05	
17.....	2.9	610	2.9	610			2.97	
18.....	3.0	695	3.0	695			2.8	
19.....	3.0	695	2.9	610			2.65	
20.....	2.8	530	2.79	523			2.85	
21.....	2.7	465	2.75	498			2.65	
22.....	2.8	530	2.71	471			2.8	
23.....	2.8	530	2.7	465			2.85	
24.....	2.8	530	2.8	530			3.05	
25.....	2.8	530	2.88	594			2.7	
26.....	2.7	465	2.98	678			2.8	
27.....	2.7	465	3.0	695			2.8	
28.....	2.7	465	2.92	627			2.95	
29.....	2.7	465	2.95	652			2.8	
30.....	2.8	530	2.92	627			2.65	
31.....			2.91	619			2.4	

† No gauge height observations from Nov. 1st to Dec. 8th.
* Ice conditions.

MONTHLY DISCHARGE of Southfork River, near Cowley, for 1910.

[Drainage area, 374 square miles.]

MONTH.	DISCHARGE IN SECOND-FEET.				RUN-OFF.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in Inches on Drainage area.	Total in acre-feet.
April.....	2,605	345	1,115.5	2.98	3.321	66,377
May.....	2,790	1,215	1,908.2	5.15	5.937	117,332
June.....	2,250	880	1,420.3	3.8	4.24	84,516
July.....	880	240	497.6	1.33	1.533	30,595
August.....	240	155	204.4	0.547	0.631	12,565
September.....	695	155	371.2	0.993	1.108	22,086
October.....	1,145	465	722.8	1.93	2.225	44,444
The period.....						377,915

CANYON CREEK, NEAR MOUNTAIN MILL.

This gauging station, located on the N.E. $\frac{1}{4}$ Sec. 14, Tp. 6, Rge. 2, W. 5th Mer., near G. Biron's ranche, was established July 6th, 1910, by H. C. Ritchie.

The gauge is a plain staff, graduated to feet and hundredths, placed at the left bank within 75 feet of Mr. Biron's corral. It is referred to a bench mark on a spike in a tree within 15 feet, elevation 14.49.

The channel is straight for 150 feet above and 30 feet below the station. Both banks are high, wooded, and will not overflow. The bed of the stream is of clean gravel and rock. The current is very swift and turbulent. On this account, discharge measurements are made about $\frac{1}{2}$ mile upstream at the traffic bridge on the road allowance to the Beaver Coal Mines.

Discharge measurements are taken from the bridge during high water stages, the initial point for soundings being on a line with the face of the left abutment. At ordinary stages the stream is waded about 100 yards downstream, the initial point for soundings being marked by a hub on the left bank.

The gauge was read by Mr. G. Biron.

DISCHARGE MEASUREMENTS of Canyon Creek, near Mountain Mill, in 1910.

Date.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Discharge.
		<i>Feet.</i>	<i>Sq. ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
June 17.....	H. C. Ritchie.....	13.6	8.22	0.846	.....	6.96*
July 6.....	".....	11	4.52	0.51	4.1	2.3
July 27.....	".....	13.5	5.55	0.317	3.96	1.76
Aug. 25.....	".....	13.6	5.12	0.31	3.95	1.58
Sept. 19.....	".....	13.5	6.32	0.29	4.0	1.81

* Measurement taken at wading station near regular station.

MILL CREEK, NEAR MOUNTAIN MILL.

This gauging station, located on the S.W. $\frac{1}{4}$ Sec. 18, Tp. 6, Rge. 1, W. 5th Mer., at the abandoned site of the old Government Mill, 9 $\frac{1}{2}$ miles west off Pincher Creek, P.O., was established July 7th, 1910, by H. C. Ritchie.

The gauge is a plain staff, graduated to feet and hundredths, placed on the left bank. It is referred to a bench mark on a spike at the northeast corner of the mill; elevation 10.97.

The channel is straight for 200 feet above and 300 feet below the station. Both banks are high, clean, rocky and will not overflow. The bed of the stream is of gravel giving a staple cross-section. The current is swift.

Discharge measurements in flood stages are taken from the bridge. In normal and low water stages the creek is waded 50 feet upstream from the gauge, the initial point for soundings being a stake on the left bank.

The gauge was read daily by Mr. J. McIlquham.

DISCHARGE MEASUREMENTS of Mill Creek, near Mountain Mill, in 1910.

Date.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Discharge.
		<i>Feet.</i>	<i>Sq. ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
June 17.....	H. C. Ritchie.....	45.4	69.97	1.72	.....	120.48*
July 7.....	".....	41	37.83	1.31	2.1	49.66*
July 27.....	".....	39.6	29.8	0.89	1.95	26.67
Aug. 25.....	".....	18.4	27.01	0.7	1.88	18.9
Sept. 19.....	".....	43.4	52.92	2.22	2.45	118.63
Oct. 14.....	".....	43	48.64	2.0	2.34	97.3

* Measurement taken at wading station, near regular station.

SESSIONAL PAPER No. 25d

DAILY GAUGE HEIGHT AND DISCHARGE in Mill Creek, near Mountain Mill, for 1910.

DAY.	July.		August.		September.		October.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	feet	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.
1.....			1.85	15	1.86	16	2.5	132
2.....			1.86	16	1.87	17	2.51	135
3.....			1.88	19	1.87	17	2.51	135
4.....			1.89	20	1.89	20	2.5	132
5.....			1.89	20	1.92	23	2.5	132
6.....			1.89	20	2.2	67	2.5	132
7.....	2.1	49	1.89	20	2.8	217	2.5	132
8.....	2.1	49	1.89	20	2.8	217	2.49	130
9.....	2.1	49	1.88	19	2.7	187	2.49	130
10.....	2.1	49	1.87	17	2.8	217	2.48	127
11.....	2.1	49	1.87	17	2.1	49	2.47	125
12.....	2.1	49	1.87	17	2.1	49	2.43	115
13.....	2.1	49	1.86	16	2.11	51	2.42	113
14.....	2.1	49	1.87	17	2.11	51	2.34	95
15.....	2.1	49	1.87	17	2.28	82	2.33	93
16.....	2.1	49	1.86	16	2.6	159	2.33	93
17.....	2.1	49	1.86	16	2.57	151	2.33	93
18.....	2.0	34	1.86	16	2.5	132	2.3	86
19.....	2.0	34	1.86	16	2.45	120	2.29	84
20.....	2.0	34	1.85	15	2.39	106	2.28	82
21.....	2.0	34	1.85	15	2.39	106	2.25	76
22.....	2.0	34	1.86	16	2.51	135	2.22	71
23.....	2.0	34	1.86	16	2.52	137	2.20	67
24.....	2.0	34	1.86	16	2.52	137	2.19	65
25.....	2.0	34	1.86	16	2.51	135	2.19	65
26.....	2.0	34	1.86	16	2.51	135	2.21	69
27.....	2.0	34	1.86	16	2.52	137	2.25	76
28.....	2.0	34	1.86	16	2.52	137	2.24	74
29.....	1.89	20	1.86	16	2.51	135	2.2	67
30.....	1.89	20	1.86	16	2.5	132	2.18	63
31.....	1.86	16	1.86	16	.....	.....	2.18	63

MONTHLY DISCHARGE of Mill Creek, near Mountain Mill, for 1910.

[Drainage area, 64 square miles.]

MONTH.	DISCHARGE IN SECOND-FEET.				RUN-OFF.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in Inches on Drainage area.	Total in acre-feet.
July (7-31).....	49	16	38.8	0.606	0.563	1,923
August.....	20	15	16.9	0.264	0.304	1,039
September.....	217	16	109.1	1.7	1.9	6,494
October.....	135	63	98.5	1.54	1.77	6,056
The period.....						15,512

PINCHER CREEK, AT PINCHER CREEK.

Under the direction of Arthur O. Wheeler, a regular gauging station was established on Pincher Creek, at Pincher Creek, in the spring of 1898. On August 13, 1906, J. F. Hamilton replaced the old gauge by a new one. Owing to local improvements the gauge has since been changed, but the station remains practically in the same place as established by Mr. Wheeler.

The gauge is a plain staff, graduated to feet and hundredths, securely fastened to the break-water on the right bank, about 20 feet below the traffic bridge. It is referred to bench marks on the north abutment and a low pile underneath the north end of the bridge; elevations 7.55 and 3.40 feet, respectively, above the zero of the gauge. It is read by P. Bertles, who lives on the north side of the creek.

During high water, discharge measurements are made from the downstream side of the bridge. At low stages, the creek is waded 450 yards upstream.

The channel is straight for about 200 yards above and 300 yards below the bridge. Both banks are high, the right being well cribbed; neither is liable to overflow. The bed is rock and free from vegetation. At the wading section, the channel is straight for about 500 yards, above and 70 yards below. Both banks are high, clean, and not liable to overflow. The bed is gravel, mixed with heavy gumbo clay.

The town of Pincher Creek has a gravity waterworks system which diverts water from the creek at a point about 3¼ miles above the bridge and the records at this station do not include the water used by the town.

DISCHARGE MEASUREMENTS of Pincher Creek, at Pincher Creek, in 1910.

Date.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Discharge.
		<i>Feet.</i>	<i>Sq. ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
May 21.....	H. C. Ritchie.....	71.0	42.15	2.82	2.05	118.77*
June 6.....	".....	34.5	20.84	2.06	1.8	42.95†
June 16.....	".....	34.4	20.97	1.922	1.79	40.56†
July 1.....	".....	10.2	6.97	2.75	1.57	19.19¶
July 1.....	".....	10.2	6.42	2.61	1.57	16.75¶
July 8.....	".....	10.0	5.32	2.21	1.48	11.8 ¶
July 19.....	".....	9.3	3.2	1.29	1.28	4.13¶
Aug. 18.....	".....	9.0	2.42	0.925	1.19	2.24¶
Aug. 26.....	".....	9.0	2.67	1.0	1.2	2.68¶
Sept. 9.....	".....	10.0	5.57	2.2	1.5	12.25¶
Sept. 17.....	".....	35.6	30.97	3.2	2.1	99.15†
Oct. 10.....	".....	35.0	21.66	2.15	1.86	46.5 †
Nov. 3.....	".....	11.5	6.22	2.22	1.56	13.9 ¶

* At Pincher Creek Bridge.
† Waded near mouth of Canal.
¶ Waded centre of Canal.

DAILY GAUGE HEIGHT AND DISCHARGE of Pincher Creek, at Pincher Creek, for 1910.

DAY.	April.		May.		June.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	1.3	5	1.9	55.5	2.0	75
2.....	1.3	5	1.9	55.5	2.1	99
3.....	1.3	5	1.8	40	2.1	99
4.....	1.4	8.1	1.8	40	2.0	75
5.....	1.4	8.1	1.7	27.7	1.9	55.5
6.....	1.3	5	1.8	40	1.9	55.5
7.....	1.3	5	1.8	40	2.0	75
8.....	1.4	8.1	1.9	55.5	2.0	75
9.....	1.4	8.1	1.9	55.5	1.9	55.5
10.....	1.4	8.1	1.7	27.7	1.9	55.5
11.....	1.4	8.1	1.9	55.5	1.9	55.5
12.....	1.3	5	1.8	40	1.9	55.5
13.....	1.4	8.1	1.7	27.7	1.8	40
14.....	1.6	18.8	2.0	75	1.8	40
15.....	1.5	12.5	2.0	75	1.8	40
16.....	1.5	12.5	2.0	75	1.8	40
17.....	1.5	12.5	2.0	75	1.8	40
18.....	1.5	12.5	1.9	55.5	1.8	40
19.....	1.5	12.5	2.0	75.5	1.8	40
20.....	1.9	55.5	2.1	99	1.8	40
21.....	1.8	40	2.0	75.5	1.7	27.7
22.....	1.8	40	2.0	75.5	1.7	27.7
23.....	1.7	27.7	2.0	75.5	1.7	27.7
24.....	1.7	27.7	1.9	55.5	1.7	27.7
25.....	1.7	27.7	2.0	75.5	1.7	27.7
26.....	1.8	40	2.0	75.5	1.7	27.7
27.....	2.0	75	2.0	75.5	1.7	27.7
28.....	1.8	40	2.0	75.5	1.6	18.8
29.....	1.9	55.5	2.0	75.5	1.6	18.8
30.....	1.9	55.5	2.0	75.5	1.5	12.5
31.....			2.0	75.5		

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DAILY GAUGE HEIGHT AND DISCHARGE of Pincher Creek, at Pincher Creek, for 1910.—*Con.*

DAY.	July.		August.		September.		October.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	1.5	12.5	1.19	2.4	1.28	4.5	2.02	79.8
2.....	1.5	12.5	1.19	2.4	1.3	5	2.0	75
3.....	1.5	12.5	1.18	2.2	1.32	5.6	2.0	75
4.....	1.5	12.5	1.18	2.2	1.36	6.7	1.97	69
5.....	1.5	12.5	1.18	2.2	1.39	7.8	1.96	67
6.....	1.5	12.5	1.17	2	1.4	8.1	1.95	65
7.....	1.5	12.5	1.17	2	1.5	12.5	1.99	73
8.....	1.6	18.8	1.16	1.9	1.51	13.1	2.0	75
9.....	1.6	18.8	1.16	1.9	1.5	12.5	2.1	99
10.....	1.5	12.5	1.16	1.9	1.51	13.1	2.1	99
11.....	1.5	12.5	1.15	1.75	1.51	13.1	2.0	75
12.....	1.5	12.5	1.15	1.75	1.53	14.2	1.9	55.5
13.....	1.5	12.5	1.15	1.75	1.57	16.8	1.9	55.5
14.....	1.4	8.1	1.15	1.75	1.62	20.4	1.87	50.7
15.....	1.4	8.1	1.15	1.75	2.02	79.8	1.85	47.5
16.....	1.4	8.1	1.14	1.65	2.01	77.4	1.84	46
17.....	1.28	4.5	1.14	1.65	1.95	65	1.84	46
18.....	1.28	4.5	1.14	1.65	1.92	59.3	1.88	52.3
19.....	1.28	4.5	1.13	1.55	1.9	55.5	1.85	47.5
20.....	1.28	4.5	1.13	1.55	1.83	44.5	1.80	40
21.....	1.27	4.2	1.12	1.45	1.79	38.7	1.76	34.8
22.....	1.27	4.2	1.12	1.45	2.01	77.4	1.76	34.8
23.....	1.27	4.2	1.12	1.45	2.04	84.6	1.74	32.3
24.....	1.26	4	1.26	4	2.1	99	1.74	32.3
25.....	1.24	3.5	1.2	2.5	2.1	99	1.7	27.7
26.....	1.21	2.7	1.16	1.9	1.79	38.7	1.73	31.2
27.....	1.21	2.7	1.14	1.65	1.84	46	1.74	32.3
28.....	1.21	2.7	1.16	1.9	1.9	55.5	1.73	31.2
29.....	1.21	2.7	1.13	1.55	1.91	57.4	1.7	27.7
30.....	1.2	2.5	1.14	1.65	2.0	75	1.68	25.7
31.....	1.19	2.4	1.16	1.9	.....	.....	1.68	25.7

MONTHLY DISCHARGE of Pincher Creek, at Pincher Creek, for 1910.

Drainage area, 52 square miles.

MONTH	DISCHARGE IN SECOND-FEET.				RUN-OFF.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on Drainage area.	Total in acre-feet.
April.....	75.0	5.0	21.75	0.418	0.466	1,294
May.....	99.0	27.7	61.31	1.179	1.358	3,770
June.....	99.0	12.5	46.5	0.894	0.997	2,767
July.....	18.8	2.4	81.7	1.571	1.811	502
August.....	4.0	1.45	1.92	0.037	0.043	118
September.....	99	4.5	40.2	0.773	0.862	2,392
October.....	99	25.7	52.53	1.01	1.164	3,233
The period.....						14,076

MISCELLANEOUS DISCHARGE MEASUREMENTS of Oldman River Drainage Basin, in 1910.

Date	Stream.	Locality.	Hydrographer.	Width.	Area of Section.	Dis-charge.
				<i>Feet.</i>		<i>Sec.-ft.</i>
June 14.	Blairmore Creek.	10-S-4-5.	H. C. Ritchie.	7.9	5.12	7.73
July 20.	"	"	"	4.5	2.07	1.88
Aug. 16.	"	"	"	6.0	2.36	2.36
Sept. 10.	"	"	"	7.5	3.84	5.35
Oct. 18.	"	"	"	10.0	5.13	7.47
Nov. 5.	"	"	"	9.8	4.43	4.78
May 23.	Crowsnest River.	N.E. 29-7-1-5.	"	108.0	231.00	551.91
June 15.	"	"	"	108.0	213.35	467.08
July 2.	"	"	"	105.5	185.32	313.72
July 23.	"	"	"	105.5	155.77	188.60
Aug. 23.	"	"	"	102.0	128.40	113.98
Sept. 14.	"	"	"	103.0	124.02	115.66
Oct. 11.	"	"	"	107.0	177.06	262.86
Aug. 4.	"	S.E. 28-7-2-5.	J. S. Tempest.			138.87
July 20.	Callum Creek.	N.W. 36-11-2-5.	"			Dry
June 13.	Creek (small).	12-8-5-5.	H. C. Ritchie.	5.2	1.21	2.41
June 29.	"	S.W. 34-13-29-4.	J. S. Tempest.	*		0.035
Aug. 11.	"	S.E. 36-7-4-5.	"	*		0.064
July 4.	Creek (spring).	N.E. 13-14-30-4.	"	*		0.049
July 4.	"	S.E. "	"	*		0.006
" 5.	"	S.E. 35-13-30-4.	"	*		Dry
" 5.	"	a N.E. 27-13-1-5.	"	*		0.012
" 5.	"	a N.W. 35-13-1-5.	"	*		0.012
" 5.	"	a "	"	*		0.023
" 20.	"	S.E. 7-12-1-5.	"	*		0.138
" 20.	"	S.E. 6-12-1-5.	"	*		0.07
" 29.	"	N.W. 26-10-3-5.	"	*		0.023
" 5.	Cecil Elton's Ditch	S.W. 19-8-1-5.	H. C. Ritchie.	4.0	1.34	0.43
" 26.	"	"	"	3.7	1.54	0.71
Aug. 5.	"	"	J. S. Tempest.			0.758
Aug. 20.	"	"	H. C. Ritchie.	*		0.49
July 29.	Ernest Creek.	N.W. 26-10-3-5.	J. S. Tempest.	*		0.52
Aug. 18.	Gold Creek.	near Frank, Alta.	H. C. Ritchie.	19.7	9.88	10.57
Oct. 19.	"	"	"	21.2	11.47	13.63
Nov. 5.	"	"	"	20.7	10.67	13.90
July 4.	Kuntz Creek.	N.W. 18-14-29-4.	J. S. Tempest.	*		0.07
June 13.	Lyon Creek.	26-7-4-5.	H. C. Ritchie.	7.0	4.34	6.99
July 20.	"	"	"			Dry
Oct. 18.	"	"	"	6.0	2.05	2.41
Nov. 4.	"	"	"	7.2	3.13	2.33
July 9.	Langford Creek.	S.E. 28-13-2-5.	J. S. Tempest.	*		0.90
" 11.	"	"	"	*		0.79
" 18.	"	S.E. 30-13-2-5.	"	*		0.28
" 18.	"	S.E. 28-13-2-5.	"	*		0.10
June 13.	McGillivary Creek,	near Coleman, Alta	H. C. Ritchie.	7.6	4.94	4.77
" 13.	W. Branch.	"	"			
" 13.	E. Branch	"	"	16.5	16.55	26.60
July 21.	McGillivary Creek	N.E. 7-8-4-5.	"	14.8	10.79	6.20
Aug. 10.	"	"	"	*		2.37
" 17.	"	"	J. S. Tempest.	14.6	10.05	3.37
Sept. 12.	"	18-8-4-5.	"	7.5	2.71	3.06
Oct. 19.	"	7-8-4-5.	H. C. Ritchie.	1.5	11.27	7.26
Nov. 4.	"	7-8-4-5.	"	15.2	11.56	6.39
July 21.	Nez-perce River.	17-8-4-5.	"	2.5	0.69	1.10
" 21.	"	"	"	11.8		0.12
Aug. 17.	"	"	"	3.5	0.84	1.04
" 10.	"	"	"	*		0.53
" 10.	"	"	"	*		0.02
Sept. 12.	"	"	"	4.0	1.19	1.78
Oct. 19.	"	"	"	11.8		0.62
" 19.	"	"	"	4.0	1.41	2.13
Nov. 4.	"	"	"	4.9	2.00	3.40
July 4.	Oldman River.	S.E. 35-7-1-5.	"	78.7	148.14	786.44
" 22.	"	N.E. 1-10-2-5.	J. S. Tempest.			265.27
" 20.	Playle Creek.	S.W. 32-11-1-5.	"	*		0.8
" 19.	Pincher Creek.	N.W. 16-6-30-4.	H. C. Ritchie.	12.7	7.20	5.71
Aug. 16.	"	N.E. 17-6-30-4.	J. S. Tempest.			4.25
" 26.	"	N.W. 16-6-30-4.	H. C. Ritchie.	7.0	2.64	2.81
July 19.	Pincher Creek	At. Intake, Pincher	"			
"	Waterworks.	Creek, Alta.	"	2.5	0.52	0.67
Aug. 12.	Southfork River.	N.W. 35-6-1-5.	J. S. Tempest.			192.35
July 11.	Stevenson's Ditch.	N.E. 12-12-28-4.	H. C. Ritchie.			Nil
Oct. 20.	"	"	"	4.0	1.99	2.10
July 2.	Sorrel Horse Creek	S.E. 26-13-30-4.	Jl S. Tempest.	*		0.012
" 11.	Trout Creek.	11-12-28-4.	H. C. Ritchie.	3.0	0.44	0.40
Oct. 21.	"	N.E. 2-12-28-4.	"	4.3	1.98	2.17
July 25.	Todd Creek.	N.W. 36-8-2-5.	J. S. Tempest.	x.		3.625
" 28.	"	S.E. 11-9-2-5.	"	b.		4.987
" 28.	"	"	"	c.		4.182
" 28.	"	S.W. 1-9-2-5.	"	b.		6.13
" 28.	"	"	"	c.		4.681
" 29.	"	N.W. 36-8-2-5.	"	d.		3.283
" 30.	"	"	"	e.		4.131



Traffic Bridge over Oldman River, near Macleod, Alta.



Traffic Bridge over Belly River, near Stand Off, Alta.

MISCELLANEOUS DISCHARGE MEASUREMENTS of Oldman River Drainage Basin, in 1910.—*Con.*

Date	Stream.	Locality.	Hydrographer.	Width.	Area of Section.	Dis-charge.
				<i>Feet.</i>		<i>Sec.-ft.</i>
Aug. 5.....	Todd Creek.....	N.W. 19-18-1-5.....	J. S. Tempest.....	A.....		2.962
" 5.....	".....	S.W. 18-8-1-5.....	".....	B.....		1.819
July 14.....	Westrup Creek....	S.W. 16-13-2-5.....	".....	x.....		0.56
June 21.....	Willow Creek.....	S.W. 36-12-28-4....	H. C. Ritchie.....	20.0	18.79	26.63
" 27.....	".....	S.E. 31-13-28-4....	J. S. Tempest.....			19.85
July 5.....	".....	N.E. 1-14-1-5.....	".....			12.92
" 21.....	".....	S.W. 36-12-28-4....	H. C. Ritchie.....	19.0	7.36	6.69
Aug. 29.....	".....	".....	".....	14.0	4.88	5.57
Sept. 26.....	".....	".....	".....	23.0	30.75	64.94
Oct. 20.....	".....	".....	".....	22.0	24.80	35.26
Nov. 16.....	".....	N.W. 30-14-2-5.....	J. S. Tempest.....	7.0	2.80	1.73
June 14.....	York Creek.....	34-7-4-5.....	H. C. Ritchie.....	21.5	24.10	62.36
July 20.....	".....	".....	".....	19.5	12.29	13.54
Aug. 16.....	".....	".....	".....	17.5	8.72	5.83
Sept. 10.....	".....	".....	".....	17.2	8.07	5.68
Oct. 18.....	".....	".....	".....	18.8	12.66	15.14
Nov. 5.....	".....	".....	".....	18.9	12.07	11.90

* Weir Measurements.

a Three separate creeks emptying into Willow Creek.

x Hot day.

b Cloudy.

c Warm and clear.

d After very hot day.

e Cool morning.

A. Above Cecil Eldon's Ditch.

B. Below "

WATERTON RIVER DRAINAGE BASIN.

General Description.

Waterton River rises in the Northwestern portion of the state of Montana, in the Eastern slope of the Rocky Mountains. It flows in a northerly direction and passing through a chain of lakes near the International Boundary, known as Waterton Lakes, it continues in a north and easterly direction and finally empties into Belly River, near Stand Off, Alta.

The topography of the basin is of a varied character, ranging from the mountainous regions of Montana to the rolling prairie of Southern Alberta. The tributaries are mostly in the upper portion of the basin, near the International Boundary and from the west side.

There is a large snow-fall in the upper portion of the basin, and the melting of this, combined with heavy rains, often causes big floods on this river in the early summer. Thereafter the river steadily decreases in volume, until the minimum is reached about mid-winter.

Waterton Lakes offer a very favourable site for a storage reservoir, approximately 14 miles long and 1 mile wide. The steep rock banks of the narrows are an ideal site for the construction of a dam. The flow could be more than doubled during the summer months and used for irrigation purposes, or a power project could easily be developed.

WATERTON RIVER, AT WATERTON MILLS.

This gauging station, located on the N.E. $\frac{1}{4}$ Sec. 8, Tp. 2, Rge. 29, W. 4th Mer., about 250 feet below the river's outlet from the lake, was established August 26th, 1908, by P. M. Sauder.

The gauge is a plain staff, graduated to feet and hundredths, placed in a box cribbing, at the right bank. It is referred to a bench mark on a tree stump within 6 feet of the gauge; elevation 9.69.

The channel is wide and straight for 300 feet above and 400 feet below the station. Both banks are high, wooded, and will not overflow. The bed of the stream is rough and rocky with a stable cross-section. The current is rather sluggish but there is a good flow at all stages.

Discharge measurements are made from a cable car during high stages. In low water the stream can be waded almost across, the deep channel in the centre being taken from the cable car. The heavy winds which blow frequently affect the measurements. The points for soundings are marked by a tagged wire stretched above the cable.

The gauge was read daily by Mr. H. H. Hanson.

DISCHARGE MEASUREMENTS of Waterton River at Waterton Mills, in 1910.

DATE.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Discharge.
		<i>Feet.</i>	<i>Sq.-ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
June 2.....	H. C. Ritchie.....	297	673.25	3.896	4.45	2623.29
June 28.....	".....	293	479.8	2.778	3.81	1332.95
July 16.....	".....	289	355.65	2.05	3.37	729.66
Aug. 12.....	".....	230	207.88	1.56	2.79	325.22
Oct. 7.....	".....	292.5	425.67	2.67	3.74	1136.8
Oct. 31.....	".....	287	397.25	2.12	3.44	842.89

DAILY GAUGE HEIGHT AND DISCHARGE of Waterton River, at Waterton Mills, for 1910.

DAY.	April.		May.		June.		July.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	3.1	520	4.2	2,100	4.5	2,925	3.7	1165
2.....	3.1	520	4.2	2,100	4.4	2,650	3.7	1165
3.....	3.1	520	4.0	1,670	4.4	2,650	3.7	1165
4.....	3.1	520	3.9	1,485	4.2	2,100	3.7	1165
5.....	3.1	520	3.9	1,485	4.2	2,100	3.7	1165
6.....	3.1	520	4.0	1,670	4.1	1,870	3.7	1165
7.....	3.1	520	4.1	1,870	4.1	1,870	3.6	1030
8.....	3.1	520	4.2	2,100	4.0	1,670	3.6	1030
9.....	3.1	520	4.4	2,650	4.1	1,870	3.7	1165
10.....	3.1	520	4.4	2,650	4.1	1,870	3.6	1030
11.....	3.2	600	4.3	2,375	4.2	2,100	3.5	910
12.....	3.2	600	4.3	2,375	4.2	2,100	3.5	910
13.....	3.2	600	4.3	2,375	4.1	1,870	3.4	795
14.....	3.3	695	4.2	2,100	4.1	1,870	3.4	795
15.....	3.4	795	4.2	2,100	4.1	1,870	3.4	795
16.....	3.4	795	4.2	2,100	4.0	1,670	3.4	795
17.....	3.4	795	4.1	1,870	4.1	1,870	3.4	795
18.....	3.4	795	4.1	1,870	4.0	1,670	3.4	795
19.....	3.5	910	4.0	1,670	4.0	1,670	3.4	795
20.....	3.7	1,165	4.0	1,670	4.1	1,870	3.4	795
21.....	3.8	1,315	4.0	1,670	4.1	1,870	3.3	695
22.....	3.9	1,485	4.0	1,670	4.0	1,670	3.3	695
23.....	3.8	1,315	4.0	1,670	4.0	1,670	3.3	695
24.....	3.8	1,315	4.4	2,650	3.9	1,485	3.2	600
25.....	4.2	2,100	4.4	2,650	3.8	1,315	3.2	600
26.....	4.3	2,375	4.4	2,650	3.8	1,315	3.2	600
27.....	4.4	2,650	4.4	2,650	3.8	1,315	3.1	520
28.....	4.4	2,650	4.4	2,650	3.8	1,315	3.1	520
29.....	4.4	2,650	4.4	2,650	3.8	1,315	3.1	520
30.....	4.3	2,375	4.4	2,650	3.7	1,165	3.0	450
31.....			4.4	2,650			3.0	450

DAILY GAUGE HEIGHT AND DISCHARGE of Waterton River, at Waterton Mills, for 1910.—*Con.*

DAY.	August.		September.		October.		November.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-Ft</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	3.0	450	2.6	248	3.6	1030	3.4	795
2.....	3.0	450	2.6	248	3.6	1030	3.35	745
3.....	3.0	450	2.6	248	3.7	1165	3.35	745
4.....	3.0	450	2.7	285	3.7	1165	3.3	695
5.....	3.0	450	2.8	332	3.7	1165	3.25	647
6.....	2.9	387	2.8	332	3.7	1165	3.2	600
7.....	2.9	387	2.7	285	3.75	1240	3.2	600
8.....	2.9	387	2.7	285	4.05	1770	3.2	600
9.....	2.9	387	2.8	332	4.0	1670	3.2	600
10.....	2.9	387	2.8	332	4.0	1670	3.3	695
11.....	2.9	387	2.9	387	3.98	1633	3.35	745
12.....	2.9	387	3.0	450	3.95	1578	3.4	795
13.....	2.9	387	3.1	520	3.9	1485	3.45	852
14.....	2.9	387	3.4	795	3.8	1315	3.45	852
15.....	2.8	332	3.4	795	3.7	1165	3.5	910
16.....	2.8	332	3.4	795	3.65	1097	3.55	970
17.....	2.8	332	3.4	795	3.6	1030	3.55	970
18.....	2.8	332	3.4	795	3.5	910	3.5	910
19.....	2.8	332	3.4	795	3.45	852	3.45	852
20.....	2.8	332	3.4	795	3.45	852	3.45	852
21.....	2.8	332	3.4	795	3.4	795	3.4	795
22.....	2.8	332	3.4	795	3.35	745	3.4	795
23.....	2.7	285	3.4	795	3.3	695	3.35	745
24.....	2.7	285	3.5	910	3.2	600	3.35	745
25.....	2.7	285	3.5	910	3.2	600	3.3	690
26.....	2.7	285	3.5	910	3.2	600	3.2	600
27.....	2.6	248	3.5	910	3.3	695	3.15	560
28.....	2.6	248	3.5	910	3.35	745	3.15	560
29.....	2.6	248	3.5	910	3.4	795	3.1	520
30.....	2.6	248	3.6	1030	3.45	852	3.05	485
31.....	2.6	248	.....	.....	3.4	795	.....	.....

MONTHLY DISCHARGE of Waterton River, at Waterton Mills, for 1910.
[Drainage area, 228 square miles.]

MONTH.	Discharge in Second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on Drainage area.	Total in acre-feet.
April.....	2,650	520	1,106	4.85	5.41	65,812
May.....	2,650	1,485	2,145	9.41	10.85	131,891
June.....	2,925	1,165	1,819	7.98	8.9	108,238
July.....	1,165	150	830	3.65	4.2	51,114
August.....	450	248	347	1.52	1.76	21,360
September.....	1,030	248	591	2.59	2.89	35,155
October.....	1,770	600	1,061	4.66	5.37	65,264
November.....	970	485	731	3.20	3.58	43,488
The period.....	.....	.....	.....	.....	.....	522,322

CROOKED CREEK, NEAR WATERTON MILLS.

This gauging station, located on the S.E. $\frac{1}{4}$ Sec. 22, Tp. 2, Rge. 29, W. 4th Mer., was established September 15th, 1909, by H. C. Ritchie.

The gauge is a plain staff, graduated to feet and hundredths, placed at the right bank. It is referred to a bench mark on a fence post, 150 feet northeast of the gauge, elevation 15.97.

The channel is straight for 20 feet above and below the station. Both banks are high, wooded, and not liable to overflow. The bed is of clean sand and gravel.

Discharge measurements are taken from a bridge, $\frac{1}{2}$ mile downstream from the gauge, during high stages. In low stages the stream is waded a little below the bridge, the initial point for soundings being at a stake on the left bank.

The gauge was read daily by Mr. H. H. Hanson.

DISCHARGE MEASUREMENTS of Crooked Creek, near Waterton Mills, in 1910.

Date.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Dis-charge.
		<i>Feet.</i>	<i>Sq. ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
June 3.....	H. C. Ritchie.....	12.7	15.84	0.976	1.97	15.45
June 28.....	".....	7	3.59	1.35	1.7	4.85
July 16.....	".....	6	2.34	0.78	1.55	1.83
Aug. 11.....	".....	5.3	1.477	0.45	1.47	0.66
Sept. 5.....	".....	7.4	4.95	1.51	1.77	7.45
Oct. 6.....	".....	9	7.55	1.69	1.96	12.75
Oct. 31.....	".....	7.9	5.82	1.54	1.85	8.95

DAILY GAUGE⁵ HEIGHT AND DISCHARGE of Crooked Creek, near Waterton Mills, in 1910.

Day.	June.		July.		August.		September.		October.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....			1.5	1.1	1.2	0.0	1.4	0.2	2.4	34.4
2.....			1.5	1.1	1.2	0.0	1.4	0.2	2.4	34.4
3.....	2.0	14.3	1.5	1.1	1.3	0.0	1.4	0.2	2.3	28.9
4.....	2.0	14.3	1.5	1.1	1.3	0.0	1.5	1.1	2.2	23.6
5.....	2.0	14.3	1.5	1.1	1.3	0.0	1.7	4.8	2.1	18.6
6.....	2.0	14.3	1.5	1.1	1.4	0.2	1.6	2.7	1.96	12.7
7.....	2.1	18.6	1.5	1.1	1.4	0.2	1.5	1.1	2.3	28.9
8.....	2.2	23.6	1.6	2.7	1.5	1.1	1.5	1.1	2.5	40.0
9.....	2.1	18.6	1.7	4.8	1.5	1.1	1.6	2.7	2.45	37.2
10.....	2.0	14.3	1.7	4.8	1.5	1.1	1.6	2.7	2.4	34.4
11.....	2.0	14.3	1.7	4.8	1.5	1.1	1.6	2.7	2.35	31.6
12.....	2.0	14.3	1.6	2.7	1.5	1.1	1.7	4.8	2.3	28.9
13.....	1.9	10.5	1.5	1.1	1.5	1.1	1.8	7.4	2.25	26.2
14.....	1.9	10.5	1.5	1.1	1.5	1.1	1.9	10.5	2.2	23.6
15.....	1.9	10.5	1.5	1.1	1.5	1.1	2.0	14.3	2.2	23.6
16.....	1.8	7.4	1.5	1.1	1.4	0.2	2.0	14.3	2.1	18.6
17.....	1.9	10.5	1.5	1.1	1.5	1.1	2.1	18.6	1.9	10.5
18.....	1.8	7.4	1.5	1.1	1.5	1.1	2.1	18.6	1.9	10.5
19.....	1.8	7.4	1.5	1.1	1.5	1.1	2.1	18.6	1.9	10.5
20.....	1.8	7.4	1.4	0.2	1.5	1.1	2.1	18.6	1.9	10.5
21.....	1.8	7.4	1.4	0.2	1.5	1.1	2.1	18.6	1.9	10.5
22.....	1.8	7.4	1.4	0.2	1.4	0.2	2.2	23.6	1.9	10.5
23.....	1.8	7.4	1.4	0.2	1.4	0.2	2.2	23.6	1.9	10.5
24.....	1.7	4.8	1.4	0.2	1.5	1.1	2.2	23.6	1.85	8.9
25.....	1.7	4.8	1.3	0.0	1.5	1.1	2.4	34.4	1.9	10.5
26.....	1.7	4.8	1.3	0.0	1.5	1.1	2.4	34.4	1.9	10.5
27.....	1.7	4.8	1.3	0.0	1.4	0.2	2.4	34.4	2.0	14.3
28.....	1.7	4.8	1.3	0.0	1.4	0.2	2.3	28.9	2.0	14.3
29.....	1.6	2.7	1.2	0.0	1.4	0.2	2.4	34.4	1.9	10.5
30.....	1.6	2.7	1.2	0.0	1.4	0.2	2.4	34.4	1.85	8.9
31.....			1.2	0.0	1.4	0.2			1.85	8.9

MONTHLY DISCHARGE of Crooked Creek, near Waterton Mills, for 1910.

Drainage area, 20 square miles.

Month.	Discharge in Second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on Drainage area.	Total in acre-feet.
June 3-30.....	23.6	2.7	10.14	0.507	0.527	563
July.....	4.8	0	1.17	0.058	0.067	72
August.....	1.1	0	0.63	0.031	0.036	39
September.....	34.4	0.2	14.5	0.725	0.809	863
October.....	10.0	8.9	19.54	0.977	1.126	1202
The period.....						2739

SESSIONAL PAPER No. 25d

MISCELLANEOUS DISCHARGE MEASUREMENTS of Waterton River Drainage Basin, in 1910.

Date.	Stream.	Locality.	Hydrographer.	Width.	Area of Section.	Dis-charge.
				<i>Feet.</i>	<i>Sq. ft.</i>	<i>Sec.-ft.</i>
August 13.....	Cottonwood Creek...	20-2-29-4.....	H. C. Ritchie.....	9.4	3.79	4.41
October 31.....	"	"	"	16.7	13.09	12.74
August 26.....	Crooked Creek.....	S.E. 22-2-29-4.....	J. S. Tempest.....	6	5.47	3.26
August 26.....	Little Crooked Creek	"	"	*	"	0.56
June 29.....	Oil Creek.....	Near Waterton Mills.	H. C. Ritchie.....	44	47.9	154.
July 15.....	"	"	"	30.5	47.59	66.94
August 12.....	"	15-1-30-4.....	"	28	25.91	22.03
September 5.....	"	"	"	28.5	27.04	22.32
November 1.....	"	"	"	35	42.84	66.33
June 29.....	Pass Creek.....	Near Waterton Mills.	"	34	47.81	167.57
July 15.....	"	"	"	32	33.54	78.56
August 12.....	"	S.W. 27-1-30-4.....	"	31.5	21.23	28.41
September 5.....	"	"	"	33.4	36.18	71.13
November 1.....	"	"	"	34.5	42.96	108.76
August 13.....	Pine Creek.....	21-3-29-4.....	"	12.5	4.71	4.89
August 19.....	"	N.E. 24-3-29-4.....	J. S. Tempest.....	"	"	4.59
November 2.....	"	S.E. 21-3-29-4.....	H. C. Ritchie.....	16.5	7.36	11.11
August 19.....	Waterton River.....	N.W. 19-3-28-4.....	J. S. Tempest.....	"	"	202.96
August 13.....	Yarrow River South.	S.W. 8-4-29-4.....	H. C. Ritchie.....	23.2	14.39	13.5
November 2.....	"	"	"	27.8	27.23	48.1
August 13.....	" North.	N.W. 17-4-29-4.....	"	19.4	9.68	12.64
November 2.....	"	"	"	24	17.14	36.39

* Weir measurement.

BELLY RIVER DRAINAGE BASIN.

General Description.

Belly River rises near Chief Mountain in Northern Montana. The main stream is augmented on the United States side of the boundary line by Middle Fork and on the Canadian side by North Fork. From the junction with North Fork on Sec. 21, Tp. 1, Rge. 28, W. 4th Mer., it flows in a winding, but northeasterly course until it is joined by Oldman River in Sec. 27, Tp. 9, Rge. 23, W. 4th Mer., where it turns southeasterly, and after making a loop flows in a north and easterly direction until it joins Bow River in Sec. 27, Tp. 11, Rge. 13, W. 4th Mer., and forms the South Saskatchewan River.

The topography of the basin is of the most varied character, ranging from the mountainous regions of Montana, the rolling prairie and foothills at the boundary to the level prairie from Lethbridge to the junction with Bow River. The upper tributaries drain a forested region but the main stream flows through a deep valley with many bluffs of large whitewood on its banks.

There is an abundant snowfall in the upper portion of the basin, but the precipitation diminishes into semi-arid conditions near Lethbridge. At first Belly River is a comparatively clear stream but soon after crossing the boundary line it gradually becomes turbid, especially at times of high water. The greater portion of the sediment is caused by the washing away of banks and cutting of new channels. Freshets caused by melting snow and heavy rains are frequent in the summer. The maximum flow usually occurs in June or July, and after that the flow gradually decreases until it reaches the minimum in January or February.

As yet very little use has been made of the water in this basin. In the upper regions where water could easily be diverted it is not required for irrigation purposes and further downstream it would be an expensive undertaking. There are, however, a number of feasible power sites which will no doubt be developed when there is a market.

BELLY RIVER, NEAR STAND OFF.

A gauging station was established on this river as early as 1906. On September 18th of that year Mr. J. F. Hamilton placed a gauge rod within 800 yards of the Police detachment at Big Bend, Alta. Measurements were taken in this vicinity until September 14th, 1908, when, owing to the changeable conditions at the station it was abandoned.

On May 27th, 1909, Mr. H. C. Ritchie established a new station at Stand Off.

The gauge consists of a plain staff, graduated to feet and hundredths. It is secured by braces to the bank at a point near Mr. G. Pearson's buildings and is read daily by him. It is referenced by two bench marks on spikes in two fence posts 25 feet and 37 feet upstream, the elevations being 7.49 and 8.35 respectively.

The discharge measurements are taken from the traffic bridge on the S.E. $\frac{1}{4}$ Sec. 21, Tp. 6, Rge. 25, W. 4th Mer., the points for soundings being painted on the lower chord of the super-structure.

For a distance of 75 feet above and 60 feet below the section the river is straight, running smoothly with a moderate velocity over a bed of clean gravel. Both banks are low, free from brush, and liable to overflow during high stages of the river.

Since the establishment of this station the cross-section has changed very little, if any, but owing to the sharp turns in the channel the river is liable to take a new course altogether in times of extreme flood.

DISCHARGE MEASUREMENTS of Belly River at Stand Off, in 1910.

Date.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Discharge.
		<i>Feet.</i>	<i>Sq. ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
May 30.....	H. C. Ritchie.....	96	271.57	3.451	2.05	937.55
June 25.....	".....	93	201.60	2.476	1.55	499.24
July 13.....	".....	91.5	184.35	2.184	1.42	402.75
August 9.....	".....	85	138.75	1.6	1.07	222.28
September 2.....	".....	84	110.41	1.257	0.89	138.79
October 3.....	".....	94	208.99	2.51	1.64	524.64
October 28.....	".....	93.5	192.56	2.17	1.49	417.01
December 12.....	W. H. Greene.....	83.5	110.83	1.096	1.0	121.47

DAILY GAUGE HEIGHT AND DISCHARGE of Belly River, at Stand Off, for 1910.

Day.	April.		May.		June.		July.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	2.4	1,310	2.1	990	2.1	990	1.6	535
2.....	2.5	1,430	2.0	890	2.1	990	1.7	615
3.....	2.4	1,310	2.0	890	2.0	890	1.7	615
4.....	2.3	1,200	1.9	795	2.0	890	1.7	615
5.....	2.2	1,090	1.7	615	1.9	795	1.6	535
6.....	2.1	990	1.5	460	1.8	700	1.6	535
7.....	2.1	990	1.5	460	1.8	700	1.6	535
8.....	2.0	890	1.6	535	1.7	615	1.5	460
9.....	2.0	890	2.2	1,090	1.8	700	1.5	460
10.....	1.9	795	2.3	1,200	1.9	795	1.5	460
11.....	1.9	795	2.2	1,090	2.0	890	1.5	460
12.....	1.8	700	2.2	1,090	2.0	890	1.5	460
13.....	1.7	615	2.0	890	2.0	890	1.5	460
14.....	1.6	535	2.0	890	1.9	795	1.4	395
15.....	1.4	395	1.9	795	1.8	700	1.5	460
16.....	1.3	340	1.8	700	1.8	700	1.5	460
17.....	1.4	395	1.8	700	1.8	700	1.6	535
18.....	1.4	395	1.7	615	1.7	615	1.5	460
19.....	1.5	460	1.7	615	1.7	615	1.5	460
20.....	1.5	460	1.9	795	1.7	615	1.5	460
21.....	1.7	615	1.9	795	1.6	535	1.4	395
22.....	1.7	615	1.9	795	1.6	535	1.4	395
23.....	1.7	615	2.0	890	1.6	535	1.3	340
24.....	1.6	535	2.0	890	1.5	460	1.3	340
25.....	1.7	615	2.1	990	1.5	460	1.3	340
26.....	1.8	700	2.1	990	1.5	460	1.3	340
27.....	2.0	890	2.2	1,090	1.5	460	1.3	340
28.....	2.1	990	2.1	990	1.5	460	1.2	285
29.....	2.2	1,090	2.1	990	1.6	535	1.2	285
30.....	2.1	990	2.0	890	1.6	535	1.2	285
31.....			2.1	990			1.2	285

DAILY GAUGE HEIGHT AND DISCHARGE of Belly River, at Stand Off, for 1910.—Continued.

Day.	August.		September.		October.		November.		December.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.
1.....	1.2	285	.9	145	1.45	392	‡			
2.....	1.2	285	.85	122	1.5	425				
3.....	1.2	285	.8	100	1.64	530				
4.....	1.2	285	.9	145	1.7	575				
5.....	1.1	235	1.0	190	1.8	655				
6.....	1.1	235	1.1	235	1.75	615				
7.....	1.1	235	1.1	235	1.64	530				
8.....	1.1	235	1.2	285	1.64	530				
9.....	1.15	260	1.3	340	1.7	575				
10.....	1.15	260	1.3	340	1.85	697				
11.....	1.16	265	1.3	340	1.95	788				
12.....	1.16	265	1.27	324	1.9	740				
13.....	1.17	270	1.23	301	1.85	697				
14.....	1.17	270	1.2	285	1.8	655				
15.....	1.2	285	1.2	285	1.75	615				
16.....	1.2	285	1.28	330	1.65	538				
17.....	1.1	235	1.6	†535	1.6	500				
18.....	1.05	212	1.8	†700	1.55	462				
19.....	1.0	190	1.75	†650	1.5	425				
20.....	1.03	203	1.6	†520	1.45	392				
21.....	.95	167	1.55	†485	1.4	360			*‡	
22.....	.95	168	1.7	†595	1.39	355			.4	
23.....	.9	145	1.8	†680	1.3	305			.9	
24.....	1.0	190	1.9	†765	1.3	305			.85	
25.....	1.1	235	1.9	†760	1.35	333			1.1	
26.....	.95	167	1.85	†705	1.4	360			1.1	
27.....	.9	145	1.75	†615	1.49	419			1.1	
28.....	.85	122	1.55	463	1.5	425			.9	
29.....	.85	123	1.5	425	1.48	412			.9	
30.....	.9	145	1.5	425	1.4	360			.9	
31.....	.9	145			1.4	360			.85	

‡ No gauge height observations from Nov. 1 to Dec. 21.
† Changing conditions, Bolster method applied.
* Ice conditions during December.

MONTHLY DISCHARGE of Belly River at Stand Off, for 1910.

Drainage area, 461 square miles.

Month.	Discharge in Second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on Drainage area.	Total in acre-feet.
April.....	1,430	340	788	1.69	1.89	46,889
May.....	1,200	460	852	1.85	2.13	52,375
June.....	990	460	682	1.48	1.65	40,564
July.....	615	285	439	0.952	1.1	26,987
August.....	285	122	220	0.478	0.551	13,552
September.....	765	100	410.8	0.891	0.994	24,444
October.....	788	305	494	1.07	1.23	30,405
The period.....						235,216

MAMI CREEK, NEAR MOUNTAIN VIEW.

This gauging station, located at the traffic bridge on the road allowance north of the N.E. $\frac{1}{4}$ Sec. 18, Tp. 2, Rge. 27, W. 4th Mer., was established August 13th, 1909, by H. C. Ritchie.

The gauge is a plain staff, graduated to feet and hundredths, fastened to a pile supporting the bridge. It is referred to a bench mark on a pile at the right bank: elevation 9.30.

The channel is curved for about 100 feet above the bridge and straight for 200 feet below. Both banks are high, clean, rocky and liable to overflow in extreme high water. The bed of the stream is stones covered with sand and gravel.

Discharge measurements during high water are taken from the bridge, which is just below the junction of the east and west branches. In low water the east branch dries up and the west branch is waded just above the junction.

The gauge was read daily by Mr. James Cowcill.

DISCHARGE MEASUREMENTS of Mami Creek, at Mountain View, in 1910.

Date.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Dis-charge.
		<i>Feet.</i>	<i>Sq. ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
June 27.....	H. C. Ritchie.....	6	0.88	0.69	1.75	0.61
September 3.....	".....	4	0.72	0.847	1.73	0.61
August 27.....	J. S. Tempest.....					Dry.
October 29.....	".....	6.5	2.63	0.88	1.86	2.31

DAILY GAUGE HEIGHT AND DISCHARGE of Mami Creek, at Mountain View, for 1910.

Day.	April.		May.		June.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	2.0	10.4	1.9	3.8	1.9	3.8
2.....	2.0	10.4	1.9	3.8	1.9	3.8
3.....	2.0	10.4	1.9	3.8	1.9	3.8
4.....	1.95	6.7	1.9	3.8	1.9	3.8
5.....	1.9	3.8	1.9	3.8	1.9	3.8
6.....	1.9	3.8	1.9	3.8	1.9	3.8
7.....	2.0	10.4	1.9	3.8	1.9	3.8
8.....	1.9	3.8	1.9	3.8	2.0	10.4
9.....	1.9	3.8	1.9	3.8	2.0	10.4
10.....	1.9	3.8	1.9	3.8	2.0	10.4
11.....	1.95	6.7	2.0	10.4	1.9	3.8
12.....	1.9	3.8	1.9	3.8	1.9	3.8
13.....	1.9	3.8	1.9	3.8	1.9	3.8
14.....	1.9	3.8	1.9	3.8	1.9	3.8
15.....	1.9	3.8	2.0	10.4	1.9	3.8
16.....	1.9	3.8	2.0	10.4	1.8	1.2
17.....	1.9	3.8	2.0	10.4	1.8	1.2
18.....	1.9	3.8	2.0	10.4	1.8	1.2
19.....	1.9	3.8	2.1	20.0	1.8	1.2
20.....	1.9	3.8	2.1	20.0	1.8	1.2
21.....	1.9	3.8	2.0	10.4	1.8	1.2
22.....	1.9	3.8	2.0	10.4	1.8	1.2
23.....	1.9	3.8	2.0	10.4	1.8	1.2
24.....	1.9	3.8	2.0	10.4	1.8	1.2
25.....	1.9	3.8	2.0	10.4	1.8	1.2
26.....	1.9	3.8	1.9	3.8	1.8	1.2
27.....	1.9	3.8	1.9	3.8	1.7	.4
28.....	1.9	3.8	1.9	3.8	1.7	.4
29.....	1.9	3.8	1.9	3.8	1.7	.4
30.....	1.9	3.8	1.9	3.8	1.7	.4
31.....			1.9	3.8		

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DAILY GAUGE HEIGHT AND DISCHARGE of Mami Creek, at Mountain View, for 1910.—Continued.

Day.	July.		August.		September.		October.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.
1.....	1.7	.4	1.0	0	1.0	0	1.9	3.8
2.....	1.7	.4	.9	0	1.6	.2	1.9	3.8
3.....	1.7	.4	.8	0	1.7	.4	1.9	3.8
4.....	1.7	.4	.7	0	1.7	.4	1.9	3.8
5.....	1.7	.4	.7	0	1.8	1.2	1.9	3.8
6.....	1.7	.4	.7	0	1.8	1.2	1.9	3.8
7.....	1.7	.4	.7	0	1.8	1.2	1.9	3.8
8.....	1.7	.4	.7	0	1.8	1.2	1.9	3.8
9.....	1.7	.4	.7	0	1.8	1.2	1.9	3.8
10.....	1.7	.4	.7	0	1.8	1.2	1.9	3.8
11.....	1.7	.4	.7	0	1.8	1.2	1.9	3.8
12.....	1.7	.4	.6	0	1.9	3.8	1.9	3.8
13.....	1.7	.4	.6	0	1.9	3.8	1.9	3.8
14.....	1.6	.2	.6	0	1.8	1.2	1.9	3.8
15.....	1.6	.2	.6	0	1.9	3.8	1.9	3.8
16.....	1.6	.2	.6	0	1.9	3.8	1.8	1.2
17.....	1.6	.2	.5	0	1.9	3.8	1.8	1.2
18.....	1.5	.0	.5	0	1.9	3.8	1.8	1.2
19.....	1.5	.0	.5	0	1.9	3.8	1.9	3.8
20.....	1.4	.0	.4	0	1.8	1.2	1.9	3.8
21.....	1.4	.0	.4	0	1.8	1.2	1.9	3.8
22.....	1.4	.0	.3	0	1.95	6.7	1.9	3.8
23.....	1.4	.0	.3	0	2.0	10.4	1.9	3.8
24.....	1.3	.0	.5	0	1.9	3.8	1.9	3.8
25.....	1.3	.0	.6	0	1.9	3.8	1.9	3.8
26.....	1.3	.0	.6	0	1.9	3.8	1.9	3.8
27.....	1.3	.0	.6	0	1.9	3.8	1.9	3.8
28.....	1.2	.0	.6	0	1.9	3.8	1.9	3.8
29.....	1.1	.0	.8	0	1.9	3.8	1.9	3.8
30.....	1.1	.0	.9	0	1.9	3.8	1.9	3.8
31.....	1.0	.0	1.0	0	.....	.....	1.9	3.8

MONTHLY DISCHARGE of Mami Creek at Mountain View, for 1910.

Drainage area, 21 square miles.

Month.	Discharge in Second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on Drainage area.	Total in acre-feet.
April.....	10.4	3.8	4.14	0.197	0.22	246
May.....	20.0	3.8	6.97	0.332	0.383	429
June.....	10.4	0.4	3.05	0.193	0.215	181
July.....	0.4	0.0	0.2	0.009	0.0104	12
August.....	0.0	0.0	0.0	0.0	0.0	.....
September.....	10.4	0.0	2.78	0.132	0.147	165
October.....	3.8	1.2	3.55	0.169	0.195	218
The period.....	.....	.....	.....	.....	.....	1251

MISCELLANEOUS DISCHARGE MEASUREMENTS in Belly River Drainage Basin, in 1910.

Date.	Stream.	Locality.	Hydrographer.	Width.	Area of Section.	Discharge
				<i>Feet.</i>		<i>Sec.-ft.</i>
June 27.....	Belly River.....	1-3-28-4.....	H. C. Ritchie.....	92.5	262.20	667.87
November 18....	".....	7-10-16-4.....	".....	416.5	1,919.12	2,941.64
August 1.....	".....	Lethbridge, Alta...	".....	341.0	1,493.85	1,706.63
August 31.....	".....	".....	".....	323.0	1,252.47	1,000.16
September 23....	".....	".....	".....	357.0	1,764.06	2,700.05
October 26.....	".....	".....	".....	352.0	1,699.80	2,429.58
November 17....	".....	N.W. 1-9-22-4.....	".....	361.0	1,859.25	2,908.79
September 11....	Chin Coulee.....	S.W. 6-10-18-4.....	J. S. Tempest.....	16.8	31.09	†30.53

† Water spilling into coulee.

ST. MARY RIVER DRAINAGE BASIN.

General Description.

St. Mary River, an important tributary of the Belly River and so indirectly of the South Saskatchewan River, heads in northern Montana on the eastern slope of the main range of the Rocky Mountains. It starts from the great Blackfoot Glacier and receives affluents from numerous lesser glaciers. These streams unite within a short distance from their source and flow into Upper St. Mary Lake. Below this lake and in close proximity is Lower St. Mary Lake, the aggregate length of the two being about 22 miles. The river flows out of the lower lake, at an elevation of 4,460 feet above mean sea level, and takes a northerly course through the foothills to the International Boundary. From the boundary it flows in a north and westerly direction, through a rolling prairie country, finally emptying into the Belly River near Lethbridge, Alta.

The basin is bounded on the south by the Rocky Mountains, on the west by the watershed between Belly and St. Mary Rivers and the east by the watershed between Milk and St. Mary Rivers. The upper portion of the basin is heavily timbered and receives its precipitation mostly in the shape of snowfall, but the lower and major portion is totally devoid of tree growth, and has a small precipitation.

The river flows through a very deep valley having steep banks making the diversion of water from this stream for irrigation an expensive undertaking. In Canada, the Alberta Railway and Irrigation Company, has water rights on this river. The headgates of their canal is at Kimball 5 miles north of the international boundary, and they already have 231 miles of ditch constructed which irrigates land surrounding Lethbridge. Further construction is being planned and the works, when completed, will irrigate approximately 500,000 acres of, at present semi-arid land.

As this is an international river, discharge measurements are taken on it by the Hydrographic Surveys Branches of both the Canadian and American governments.

LEE CREEK AT CARDSTON.

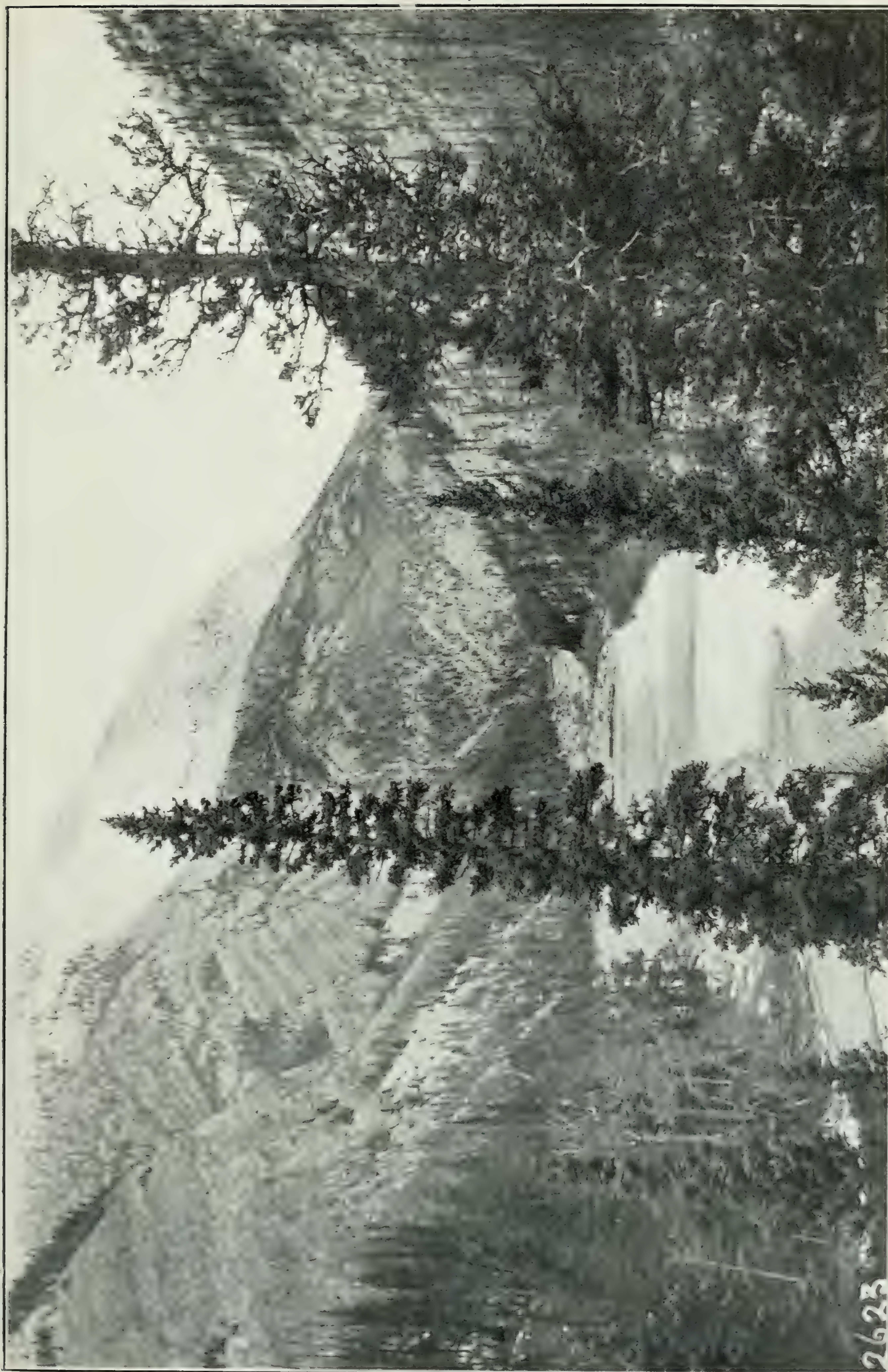
A regular gauging station was established on Lee Creek, by H. C. Ritchie on June 28th, 1909. It is situated in the eastern portion of the town of Cardston, in the N.W. $\frac{1}{4}$ Sec. 10, Tp. 3, Rge. 25, W. 4th. Mer.

The gauge which consisted of a plain staff, graduated to feet and hundredths, was securely fastened to the foot-bridge, crossing the creek at this point. It was referred to a bench mark nearby; elevation 8.45. On the 28th of July the foot-bridge was washed out by the flood, taking the gauge with it. On August 11th, Mr. Ritchie put in a new gauge which he securely fastened to a post, placed in the right bank of the stream. The new location of the gauge is about 50 feet upstream from the old and is referred to a bench mark of elevation 8.40.

Before the flood, the discharge measurements were taken at a wading section near the foot-bridge. Since establishing the new gauge measurements have been taken at a wading station about 40 feet above the present location of the gauge; a permanent initial point for soundings being established by driving a stake into the right bank.

The channel is straight for about 100 feet above and 300 feet below the section. The bed is composed of a shallow layer of soft sand over a gravel formation. The current which has a medium velocity is quite uniform. The right bank is a high clay while the left is low and stony and liable to overflow in high water.

The gauge is read by Mr. Sterling Williams.



2623

"The Gap", on Oldman River, at the Livingstone Range of Mountains.

DISCHARGE MEASUREMENTS of Lee Creek at Cardston, in 1910.

Date	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Discharge.
		<i>Feet.</i>	<i>Sq.-ft.</i>	<i>Ft. per sec</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
April 11.....	L. J. Gleeson.....	47.6	45.5	1.15	1.7	52.3*
April 23.....	".....	48.3	34.8	0.94	1.65	32.8*
May 7.....	".....	33.5	33.1	0.97	1.65	32.2*
May 21.....	".....	54.5	52.7	2.31	2.03	121.8
June 4.....	".....	35.9	43.0	1.26	1.72	54.1
June 18.....	".....	33.4	34.9	1.09	1.64	38.0*
July 4.....	".....	32.8	25.1	0.88	1.47	22.2*
July 27.....	F. H. Peters.....	20.0	8.79	0.80	1.28	6.02*
August 9.....	".....	14.1	8.02	0.87	1.25	5.95*
September 5.....	N. M. Sutherland.....	20.0	20.2	2.51	1.68	50.8*
September 20.....	".....	18.5	18.3	2.38	1.59	43.6*
October 7.....	".....	20.4	21.1	2.79	1.62	58.9*
October 8.....	".....	20.5	21.6	2.92	1.64	63.0*
October 24.....	".....	20.2	17.0	2.0	1.75	34.0*
November 10.....	".....	20.4	16.6	2.04	1.45	33.9*
December 20.....	W. H. Greene.....	29.0	93 1	0.815	2.15	18.82*

* Measurements taken at wading stations near regular station.

DAILY GAUGE HEIGHT AND DISCHARGE of Lee Creek at Cardston, for 1910.

DAY.	April.		May.		June.		July.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	1.5	23.8	1.6	26.5	1.7	50.2	1.5	25.0
2.....	1.5	23.8	1.7	39.2	1.7	50.2	1.4	16.2
3.....	1.5	23.8	1.7	39.2	1.7	50.2	1.4	16.2
4.....	1.5	23.8	1.7	39.2	1.7	50.2	1.4	16.2
5.....	1.5	23.8	1.6	26.5	1.7	50.0	1.4	16.5
6.....	1.5	23.8	1.6	26.5	1.7	50.0	1.4	16.5
7.....	1.5	23.8	1.6	26.5	1.8	71.2	1.4	16.5
8.....	1.5	23.8	1.6	28.2	2.0	117.8	1.4	16.5
9.....	1.6	35.5	1.5	19.8	1.9	93.8	1.4	16.5
10.....	1.6	35.5	1.6	30.8	1.8	71.0	1.4	16.5
11.....	1.6	35.5	1.7	46.0	1.8	71.0	1.4	16.5
12.....	1.6	35.0	1.7	46.8	1.8	70.8	1.4	16.5
13.....	1.7	50.8	1.7	47.0	1.7	49.2	1.4	16.5
14.....	1.7	50.0	1.7	47.0	1.7	49.0	1.4	16.5
15.....	1.6	33.2	1.7	47.2	1.7	48.8	1.4	16.5
16.....	1.6	32.5	1.7	47.5	1.7	48.5	1.3	10.0
17.....	1.6	31.8	1.8	62.5	1.6	32.8	1.3	9.8
18.....	1.6	30.8	1.9	91.2	1.6	32.5	1.3	9.8
19.....	1.6	30.0	2.1	138.0	1.6	33.0	1.3	9.5
20.....	1.7	43.2	2.0	115.0	1.6	33.5	1.3	9.5
21.....	1.7	42.2	2.0	115.0	1.6	34.0	1.3	9.2
22.....	1.6	27.8	1.9	92.5	1.5	23.0	1.3	9.2
23.....	1.6	26.8	1.9	92.5	1.5	23.2	1.3	9.0
24.....	1.6	26.8	1.9	92.8	1.5	23.5	1.3	8.8
25.....	1.6	26.8	1.8	70.2	1.5	23.8	1.3	8.5
26.....	1.6	26.8	1.8	70.5	1.5	24.0	1.2	4.2
27.....	1.6	26.8	1.8	70.5	1.5	24.2	1.2	4.0
28.....	1.6	26.8	1.8	70.8	1.5	24.5	1.2	4.2
29.....	1.6	26.8	1.8	71.0	1.5	24.8	1.2	4.3
30.....	1.6	26.8	1.8	71.2	1.5	24.8	1.2	4.4
31.....			1.8	71.5			1.2	4.5

DAILY GAUGE HEIGHT AND DISCHARGE of Lee Creek at Cardston, for 1910.—Continued.

DATE	August.		September.		October.		November.		December.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.
1.....	1.2	4.6	1.3	14.8	1.9	124.0	1.4	25.5	.....	.....
2.....	1.2	4.6	1.4	22.0	1.8	97.0	1.4	25.8	.....	.....
3.....	1.2	4.7	1.4	22.5	1.8	97.5	1.4	25.8	.....	.....
4.....	1.2	4.7	1.4	23.2	1.7	75.0	1.4	25.8	.....	.....
5.....	1.2	4.8	1.5	34.8	1.7	75.8	1.4	25.8	.....	.....
6.....	1.1	2.0	1.5	34.7	1.6	54.0	1.4	26.0	.....	.....
7.....	1.1	2.1	1.6	50.8	1.6	54.8	1.4	26.0	.....	.....
8.....	1.1	2.2	1.6	50.2	1.6	54.2	1.4	26.2	.....	.....
9.....	1.1	2.5	1.6	50.0	1.6	54.8	1.4	26.2	.....	.....
10.....	1.1	2.5	1.6	49.8	1.6	55.0	1.5	39.0	.....	.....
11.....	1.1	2.8	1.6	49.5	1.6	55.5	1.5	.....	.....	.....
12.....	1.1	3.0	1.6	49.2	1.6	56.0	1.5	.....	.....	.....
13.....	1.2	6.5	1.6	49.0	1.6	56.2	1.5	.....	.....	.....
14.....	1.2	6.8	1.6	48.5	1.6	56.5	1.5	.....	.....	.....
15.....	1.2	7.2	1.6	48.0	1.5	38.8	1.5	.....	.....	.....
16.....	1.2	7.4	1.6	47.5	1.5	38.8	1.5	.....	.....	.....
17.....	1.2	7.6	1.7	67.5	1.5	38.8	1.5	.....	.....	.....
18.....	1.2	7.8	1.7	67.0	1.5	38.8	1.5	.....	.....	.....
19.....	1.2	8.0	1.7	66.2	1.5	38.8	1.5	.....	.....	.....
20.....	1.2	8.1	1.7	65.8	1.5	38.5	1.5	.....	2.15	.....
21.....	1.2	8.2	1.7	66.5	1.5	38.2	1.5	.....	2.15	.....
22.....	1.2	8.5	1.8	90.0	1.5	38.0	1.5	.....	1.7	.....
23.....	1.2	8.6	1.9	114.8	1.5	37.5	1.5	.....	1.6	.....
24.....	1.2	8.6	1.9	114.8	1.5	37.2	1.5	.....	2.2	.....
25.....	1.2	8.7	1.8	92.2	1.4	25.0	1.5	.....	2.3	.....
26.....	1.2	8.8	1.8	93.2	1.4	25.0	1.5	.....	2.5	.....
27.....	1.2	8.8	1.8	94.0	1.4	25.0	1.5	.....	2.5	.....
28.....	1.2	8.8	1.8	94.5	1.4	25.0	1.5	.....	2.4	.....
29.....	1.3	14.8	1.9	117.8	1.4	25.2	1.5	.....	1.7	.....
30.....	1.3	14.8	1.9	118.2	1.4	25.2	1.5	.....	1.6	.....
31.....	1.3	14.8	.....	.....	1.4	25.5	.....	.....	1.6	.....

No observations Dec. 1st to Dec. 20th. Ice conditions from Nov. 20th.

MONTHLY DISCHARGE of Lee Creek at Cardston, for 1910.
[Drainage area, 103 square miles.]

Month.	Discharge in Second-Feet.				Run-Off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on Drainage area.	Total in acre-feet.
April.....	50.8	23.8	30.6	0.297	0.331	1,821
May.....	138.0	19.8	60.6	0.588	0.678	3,726
June.....	117.8	23.0	45.8	0.445	0.496	2,725
July.....	25.0	4.0	8.8	0.085	0.098	541
August.....	14.8	2.0	60.9	0.067	0.077	424
September.....	118.2	14.8	63.7	0.617	0.688	3,784
October.....	124.0	25.0	49.2	0.478	0.551	3,025
The period.....	.....	.....	.....	.....	.....	16,046

ST. MARY RIVER AT KIMEALL.

This station was established by the Alberta Railway and Irrigation Company, in 1905. It is located on the S.W. $\frac{1}{4}$ Sec. 25, Tp. 1, Rge, 25. W. 4th Mer., about one half mile above the company's dam and headgate.

The channel is straight for about 450 feet above and 400 feet below the station. Both banks are high and not liable to overflow. The right bank is partly covered with scrub above the station, but at and below the station it is clear. The bed of the stream is of gravel and is liable to slight changes. Since the flood of 1908, the cross-section and current have been quite uniform.

Discharge measurements are made by means of a cable, car, and tagged wire. The initial point for scundings is zero of the tagged wire, which is 44.8 feet from the inside edge of the cable support on the right bank.

SESSIONAL PAPER No. 25d

The gauge, which is a plain staff, graduated to feet and tenths, is set in the right bank, a few feet above the cable. A trench lined with plank, connects a stilling box about the gauge with the channel in low water. The zero of the gauge is 14.12 feet below the top of the east end of the lower sill of the cable support, on the right bank.

In 1910, the gauge was read by J. M. Dunn, Ditch Rider for A. R. & I. Co.

DISCHARGE MEASUREMENTS of St. Mary River at Kimball, in 1910.

DATE	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Discharge.
1910		<i>Feet.</i>	<i>Sq.-ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
April 9.....	L. J. Gleeson.....	217.6	396.1	1.63	2.79	644
April 12.....	".....	220.1	428.8	1.78	3.01	753
April 22.....	".....	223.7	544.9	2.38	3.51	1,299
April 25.....	".....	223.9	576.2	2.51	3.61	1,443
May 6.....	".....	223.9	587.9	2.69	3.67	1,584
May 7.....	".....	225.1	724.8	3.46	4.26	2,506
May 23.....	".....	224.2	645.9	2.96	3.93	1,912
June 6.....	".....	226.0	686.0	3.15	4.05	2,158
June 20.....	".....	224.0	709.5	3.28	4.10	2,317
July 2.....	".....	224.0	625.6	2.82	3.75	1,764
July 26.....	F. H. Peters.....	223.5	472.5	2.20	3.25	1,040
August 6.....	".....	222.3	412.2	1.68	2.95	694
August 10.....	".....	222.3	390.1	1.59	2.85	620
September 3.....	N. M. Sutherland.....	220.4	320.7	1.16	2.53	372
September 9.....	".....	221.2	350.0	1.29	2.65	453
September 19.....	".....	221.7	399.5	1.54	2.86	617
September 22.....	".....	222.5	425.9	1.73	2.99	735
October 5.....	".....	225.0	578.8	2.18	3.385	1,134
October 10.....	".....	225.3	614.3	2.70	3.75	1,658
October 25.....	".....	222.2	411.7	1.66	2.95	681
October 26.....	".....	223.0	487.8	2.14	3.24	1,044
November 8.....	".....	221.7	398.3	1.58	2.88	625
December 3.....	W. H. Greene.....	227.6	119.7	2.20	5.15	264*
December 19.....	".....	68.1	109.4	2.58	4.47	282*

* Ice Conditions.

DAILY GAUGE HEIGHT AND DISCHARGE of St. Mary River at Kimball, for 1910.

DAY.	April.		May.		June.		July.	
	Gauge.	Dis-	Gauge.	Dis-	Gauge.	Dis-	Gauge	Dis-
	Height.	charge.	Height.	charge.	Height.	charge.	Height.	charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	2.81	575	4.01	2,085	4.50	2,985	3.75	1,655
2.....	2.81	575	3.91	1,915	4.40	2,800	3.75	1,655
3.....	2.71	500	3.81	1,750	4.38	2,765	3.70	1,580
4.....	2.71	500	3.71	1,590	4.29	2,595	3.70	1,580
5.....	2.71	500	3.67	1,535	4.14	2,320	3.66	1,520
6.....	2.71	500	3.65	1,505	4.03	2,120	3.72	1,610
7.....	2.81	575	3.75	1,655	4.03	2,120	3.69	1,565
8.....	2.81	575	4.05	2,160	4.20	2,430	3.57	1,385
9.....	2.81	575	4.25	2,520	4.16	2,360	3.53	1,325
10.....	2.91	660	4.41	2,820	4.10	2,245	3.46	1,230
11.....	3.01	750	4.41	2,820	4.10	2,245	3.43	1,190
12.....	3.01	750	4.31	2,635	4.13	2,300	3.39	1,140
13.....	3.14	870	4.21	2,450	4.27	2,550	3.40	1,150
14.....	3.11	840	4.21	2,450	4.16	2,360	3.39	1,140
15.....	3.11	840	4.11	2,265	4.10	2,245	3.40	1,150
16.....	3.11	840	4.11	2,265	4.20	2,430	3.44	1,205
17.....	3.11	840	4.01	2,085	4.20	2,430	3.45	1,220
18.....	3.11	840	3.91	1,915	4.20	2,430	3.44	1,205
19.....	3.21	940	4.01	2,085	4.16	2,360	3.42	1,180
20.....	3.53	1,090	3.99	2,050	4.10	2,245	3.40	1,150
21.....	3.53	1,325	3.91	1,915	4.00	2,070	3.37	1,115
22.....	3.59	1,415	3.81	1,750	3.98	2,035	3.34	1,075
23.....	3.51	1,300	3.90	1,900	3.90	1,900	3.30	1,035
24.....	3.51	1,300	4.04	2,140	3.89	1,880	3.29	1,025
25.....	3.61	1,445	4.24	2,500	3.78	1,705	3.26	990
26.....	3.85	1,815	4.40	2,800	3.66	1,520	3.26	990
27.....	4.04	2,140	4.40	2,800	3.71	1,590	3.20	930
28.....	4.21	2,450	4.40	2,800	3.80	1,740	3.14	870
29.....	4.21	2,450	4.33	2,670	3.80	1,740	3.08	810
30.....	4.11	2,265	4.40	2,800	3.80	1,740	3.05	785
31.....			4.40	2,800			3.01	750

DAILY GAUGE HEIGHT AND DISCHARGE of St. Mary River at Kimball, for 1910. *Continued.*

DAY.	August.		September.		October.		November.		December.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	3.04	775	2.48	335	2.96	705	3.18	910	2.78	.....
2.....	3.01	750	2.50	350	3.18	910	3.07	800	2.77	.....
3.....	3.01	750	2.53	370	3.38	1,125	3.07	800	5.38	.....
4.....	3.00	740	2.58	405	3.42	1,180	3.06	795	5.58	.....
5.....	2.99	730	2.61	425	3.40	1,150	3.07	800	6.43	.....
6.....	2.95	695	2.65	455	3.39	1,140	3.07	800	4.83	.....
7.....	2.94	685	2.67	470	3.39	1,140	2.98	720	4.73	.....
8.....	2.92	665	2.65	455	3.69	1,565	2.87	625	4.75	.....
9.....	2.89	640	2.65	455	3.74	1,640	2.89	640	4.68	.....
10.....	2.85	610	2.65	455	3.75	1,655	3.00	740	4.78	.....
11.....	2.85	610	2.66	465	3.75	1,655	2.98	720	4.83	.....
12.....	2.85	610	2.65	455	3.69	1,565	2.97	710	6.13	.....
13.....	2.86	615	2.64	445	3.61	1,445	2.94	685	4.98	.....
14.....	2.85	610	2.61	425	3.55	1,355	2.92	665	4.66	.....
15.....	2.85	610	2.62	435	3.46	1,230	2.91	660	4.38	.....
16.....	2.82	585	2.73	515	3.38	1,125	2.98	720	4.70	.....
17.....	2.78	555	2.90	650	3.33	1,065	3.09	820	4.90	.....
18.....	2.76	540	2.90	650	3.28	1,010	3.07	800	4.61	.....
19.....	2.73	515	2.87	625	3.26	990	3.04	775	4.50	.....
20.....	2.69	485	2.85	610	3.25	980	3.02	755	4.48	.....
21.....	2.68	475	2.85	610	3.20	930	3.01	750	4.97	.....
22.....	2.66	465	2.99	730	3.08	810	3.00	740	5.03	.....
23.....	2.65	455	3.00	740	3.03	765	2.98	720	.....	.....
24.....	2.70	490	3.00	740	2.97	710	2.96	700	5.33	.....
25.....	2.67	470	2.98	720	2.97	710	2.93	675	5.88	.....
26.....	2.59	410	2.96	700	3.20	930	2.89	640	6.08	.....
27.....	2.57	400	2.94	685	3.26	990	2.85	610	5.25	.....
28.....	2.55	385	2.91	660	3.28	1,010	2.77	545	6.35	.....
29.....	2.55	385	2.88	635	3.31	1,045	2.72	505	6.46	.....
30.....	2.53	370	2.89	640	3.29	1,025	2.70	495	6.45	.....
31.....	2.49	345	.....	.....	3.26	990	.....	.....	6.44	.....

Ice Conditions after Nov. 24.
Dec. 3, Ice on A. R. & I. Dam, backed water on rod.

MONTHLY DISCHARGE of St. Mary River at Kimball, for 1910.

[Drainage area 472 sq. miles.]

Month.	Discharge in Second-Feet.				Run-Off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on Drainage area.	Total in acre-feet.
April.....	2,450	500	1,068	2.26	2.525	63,550
May.....	2,820	1,505	2,206	4.69	5.407	135,642
June.....	2,985	1,520	2,208	4.68	5.219	131,382
July.....	1,655	750	1,176	2.49	2.873	72,312
August.....	775	345	562	1.19	1.373	34,556
September.....	740	335	544	1.15	1.286	32,370
October.....	1,655	705	1,114	2.36	2.721	68,498
November.....	910	495	711	1.50	1.675	42,307
The period.....	.....	.....	.....	.....	.....	580,617

ALBERTA RAILWAY AND IRRIGATION COMPANY'S CANAL, NEAR KIMBALL.

This station was established on July 26th, 1910, by F. H. Peters. Discharge measurements are made from a foot-bridge, erected for that purpose by the A. R. and I. Co., at the middle of the flume over Rolph Creek.
This flume which carries all the water delivered to the Company's system is located on Sec. 21, Tp. 2, Rge. 24, W. 4th Mer. It is about 6 miles from Kimball and about 15 miles from Cardston.

SESSIONAL PAPER No. 25d

The gauge used in 1910 was the Company's old rod at the upper end of the flume which was divided into feet and inches. On October 25th, 1910, a new rod was set on the right side of the flume and will be used in future. This gauge was made of 1 inch by 4 inches material 6 feet long with a bevelled edge and is divided into feet and inches.

The initial point for soundings is the inside face of the left side of the flume. The datum of the gauge is the bottom of the flume.

The gauge is read daily by J. M. Dunn, the Company's ditch rider.

DISCHARGE MEASUREMENTS of The Alberta Railway & Irrigation Company's Canal, near Kimball in 1910.

DATE	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Discharge.
		Feet.	Sq.-ft.	Ft. per sec	Inches.	Sec.-ft.
May 7.....	L. J. Gleeson.....	37.8	125.9	1.37	.....	172†
May 9.....	“.....	40.8	155.4	1.20	.....	274†
June 20.....	F. H. Peters.....	47.5	280.3	3.05	.....	855†
July 26.....	“.....	27.2	85.1	5.57	36	474*
August 8.....	“.....	44.2	207.1	2.62	.....	542†
August 8.....	“.....	27.2	88.4	6.05	38	535*
September 8.....	N. M. Sutherland.....	27.2	78.8	5.47	33	431*
September 21.....	“.....	27.2	88.4	5.91	37	523*
October 3.....	“.....	27.2	62.6	4.81	25	301*
October 4.....	“.....	27.2	55.8	4.38	23	244*
October 5.....	“.....	27.2	36.7	3.10	14	114*
October 6.....	“.....	27.2	27.2	2.49	10	685*

† At Bridge No. 1, near Intake of Canal.

* At Flume.

DAILY GAUGE HEIGHT AND DISCHARGE of The Alberta Railway and Irrigation Company's Canal, near Kimball, for 1910.

DAY.	May.		June.		July.		August.		September.		October.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	Ins.	Sec.-ft.	Ins.	Sec.-ft.	Ins.	Sec.-ft.	Ins.	Sec.-ft.	Ins.	Sec.-ft.	Ins.	Sec.-ft.
1.....	17	155	31	398	44	660	40	576	27	323	32	417
2.....	17	155	31	398	44	660	40	576	28	341	32	417
3.....	17	155	31	398	44	660	39	555	28	341	26	305
4.....	17	155	31	398	44	660	38	535	28	341	22	236
5.....	17	155	36	495	43	638	38	535	29	360	14	114
6.....	17	155	36	495	43	638	37	515	29	360	10	68
7.....	17	155	41	597	42	618	37	515	31	398	.....	.....
8.....	21	219	42	618	42	618	38	535	32	417	.....	.....
9.....	24	270	44	660	42	618	37	515	32	417	.....	.....
10.....	24	270	48	748	41	597	37	515	32	417	.....	.....
11.....	24	270	49	770	41	597	37	515	32	417	.....	.....
12.....	24	270	43	638	41	597	37	515	32	417	.....	.....
13.....	23	253	44	660	40	576	37	515	32	417	.....	.....
14.....	24	270	44	660	40	576	37	515	31	398	.....	.....
15.....	21	219	45	682	40	576	37	515	32	417	.....	.....
16.....	21	219	45	682	40	576	37	515	31	455	.....	.....
17.....	23	253	44	660	40	576	36	495	37	515	.....	.....
18.....	27	323	45	682	40	576	36	495	36	495	.....	.....
19.....	29	360	45	682	40	576	35	475	36	495	.....	.....
20.....	30	379	53	858	40	576	34	455	26	305	.....	.....
21.....	30	379	44	660	39	555	34	455	37	515	.....	.....
22.....	30	379	44	660	38	535	33	436	37	515	.....	.....
23.....	30	379	45	682	38	535	32	417	37	515	.....	.....
24.....	30	379	45	682	37	515	33	436	36	495	.....	.....
25.....	31	398	44	660	36	495	32	417	32	417	.....	.....
26.....	31	398	44	660	36	495	30	379	30	379	.....	.....
27.....	31	398	43	638	36	495	29	360	30	379	.....	.....
28.....	31	398	44	660	36	495	29	360	30	379	.....	.....
29.....	31	398	45	682	35	475	28	341	30	379	.....	.....
30.....	31	398	45	682	35	475	27	323	31	398	.....	.....
31.....	31	398	.....	.....	35	475	27	323	.....	.....	.....	.....

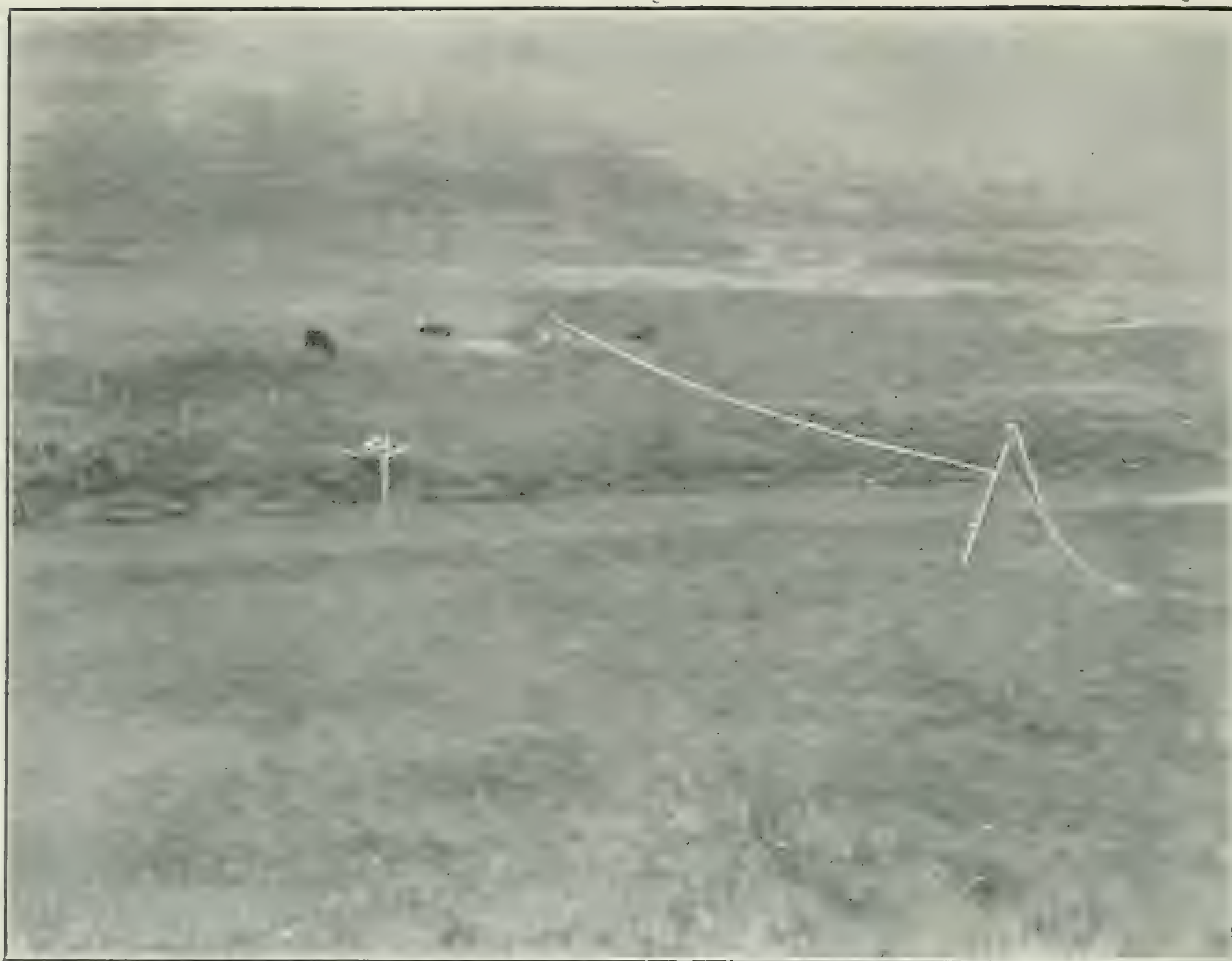
MONTHLY DISCHARGE of The Alberta Railway & Irrigation Company's
Canal, near Kimball, for 1910.

Month.	Discharge in Second-Feet.			Total Discharge in acre-feet.
	Maximum.	Minimum.	Mean.	
May.....	398	155	289	17,776
June.....	770	398	628	37,369
July.....	660	475	571	35,109
August.....	576	323	472	29,022
September.....	515	305	414	24,635
October (1-6).....	417	68	260	3,088
The period.....				146,999

MISCELLANEOUS DISCHARGE MEASUREMENTS of St. Mary River Drainage Basin, in 1910.

DATE	Stream.	Locality.	Hydrographer.	Width.	Area of Section.	Discharge.
				<i>Feet.</i>		<i>Sec.-ft.</i>
April 12.....	Aetna Creek.....	near Aetna, Alta..	L. J. Gleeson.....	*	.....	0.10
June 20.....	".....	".....	".....	*	.....	0.10
August 28.....	Boundary Creek...	S.E. 19-1-26-4.....	J. S. Tempest.....	†	.....	0.41
April 12.....	Rolph Creek.....	Taylorville, Alta..	L. J. Gleeson.....	*	15.00	7.50
April 26.....	".....	".....	".....	* 5.0	1.50	2.10
May 6.....	".....	".....	".....	4.5	3.60	1.32
May 21.....	".....	".....	".....	* 5.0	5.00	3.00
May 24.....	".....	".....	".....	11.9	6.98	8.04
June 3.....	".....	".....	".....	* 7.0	3.50	2.45
June 7..	".....	".....	".....	* 7.0	3.50	2.45
June 17.....	".....	".....	".....	* 5.0	1.50	1.30
June 21.....	".....	".....	".....	* 5.0	1.25	1.25
July 1.....	".....	".....	".....	.....	.....	Dry
October 1.....	".....	".....	N. M. Sutherland	10.0	2.70	1.99
October 10.....	".....	22-1-24-4.....	".....	.....	.....	Nil
October 24.....	".....	".....	".....	.....	.....	0.20

† Weir measurement.
* Float measurement.



Cable Station on North Branch of Milk River, at Peter's Rancho.



Cable Station on North Branch of Milk River, at Knight's Rancho.

MILK RIVER DRAINAGE BASIN.

General Description.

Milk River rises on the eastern slope of the foothills, in the Blackfeet Indian Reserve, in the United States. Its headwaters run down in two main streams, which are known, after entering Canada, as the north and south branches. The north branch runs in a north-easterly direction through the Blackfeet Reserve for a distance of about 15 miles and then enters Canada near the south-east corner of the south-west quarter of Section 3, Township 1, Range 23, West of the 4th Meridian. From the international boundary the stream continues in a north-easterly direction for about nine miles when it bends to the east and runs in an easterly direction through the second tier of townships to its junction with the South branch at the south-west corner of the north-east quarter of Section 20, Township 2, Range 18, West of the 4th Meridian.

The south branch runs to the south and east of, and parallels the north branch for a distance of about 48 miles, as the crow flies, through the Blackfeet Reserve and then enters Canada near the south-east corner of the south-west quarter of Section 1, Township 1, Range 20, West of the 4th Meridian. From the international boundary it runs in a north-easterly direction to its junction with the north branch. From the junction of the two branches, Milk River runs in an easterly direction through the second tier of townships in Canada to the east boundary of Range 7. From this point, the river runs in a south-easterly direction to its first point of crossing the international boundary into the United States. This first point of crossing is near the south-west corner of the south-east quarter of Section 5, Township 1, Range 5, West of the 4th Meridian. From this point the river meanders in an easterly direction through Canada and United States to a point on the international boundary about 900 feet west of the east boundary of Section 1, Township 1, Range 5, West of the 4th Meridian where it finally crosses into the United States. This point is known as the "Eastern Crossing." The length of the course of Milk River in Canada from the western crossing of the north branch to the eastern crossing is 179 miles. The length of the course of the south branch in Canada is 20 miles.

Throughout its course in Canada from the western crossing of the north branch to the eastern crossing Milk River runs through a well defined valley bordered on each side by a range of hills. The whole of its watershed in Canada is bald prairie land. The river receives a number of small tributary creeks along its course all of which discharge a considerable volume of water during the spring freshets; they all dry up by July 1 (about), and have no considerable discharge again until late in the fall when some of them have a small flow for perhaps a month before the freeze up. The same remarks apply to the South branch in its course through Canada.

The general conditions of flow in the river are such as are typical of all rivers which have a watershed devoid of tree growth; that is, it is subject to extreme floods during the freshet period and to correspondingly low flow during the summer months. From its headwaters to the eastern crossing the total area of the watershed of Milk River is 2,448 square miles. Of this total amount 1,645 square miles are in Canada and 803 square miles in the United States.

NORTH BRANCH OF MILK RIVER AT PETER'S RANCHE.

This station was established by P. M. Sauder and F. H. Peters on July 21st, 1909. It is located 150 feet upstream from the north boundary of Sec. 13, Tp. 1, Rge. 23, W. 4th Mer. It is 7 miles by trail from Taylorville, P.O. and 15 miles from Kimball.

The stream flows in one channel, which is about 40 feet wide at ordinary stages. The channel is straight for about 200 feet above the station and is almost straight for about 300 feet below. Both banks are composed of solid clay. The right is high and not liable to overflow, but the left may overflow at extreme flood stage of the stream. The bed of the stream is composed of a layer of soft mud and stones over a solid clay formation.

Discharge measurements are made by means of a cable, car, tagged wire and stay wire. The initial point for soundings is the face of a post on the left bank.

The gauge which is a plain staff, graduated to feet and hundredths, is fixed to a post at the left bank. It is referred to the top of the post at the initial point for soundings; elevation, 13.13 above the datum of the gauge. During 1910, it was read by Bert Meham.

DISCHARGE MEASUREMENTS of North Branch of Milk River at Peter's Ranche, in 1910.

DATE	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Discharge.
1910.		<i>Feet.</i>	<i>Sq.-ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
April 9.....	L. J. Gleeson.....	40.5	59.0	0.69	1.79	40.8
April 13.....	".....	40.8	59.2	0.78	1.79	46.1
April 21.....	".....	40.6	54.7	0.75	1.69	40.9
April 26.....	".....	42.5	41.8	0.74	1.70	30.9
May 5.....	".....	41.3	52.5	0.68	1.66	35.6
May 11.....	".....	41.5	62.7	0.85	2.00	53.3
May 20.....	".....	42.0	65.0	0.91	2.03	59.2
May 24.....	".....	41.4	54.0	0.58	1.68	31.3
June 3.....	".....	42.0	61.4	0.50	1.76	31.0
June 8.....	".....	41.9	75.6	0.88	2.21	66.1*
June 16.....	".....				1.80	25.2*
June 21.....	".....				1.67	29.5*
June 30.....	".....				1.71	25.9*
July 6.....	".....				1.65	23.1*
July 23.....	F. H. Peters.....				1.51	20.0*
July 29.....	".....				1.51	20.4*
August 5.....	".....				1.51	19.4*
August 11.....	".....				1.47	18.4*
September 2.....	N. M. Sutherland.....	41.6	50.2	0.55	1.60	27.7*
September 10.....	".....				1.58	26.3*
September 18.....	".....				1.49	22.0*
September 23.....	".....				1.58	26.4*
September 30.....	".....				1.50	23.6*
October 11.....	".....	41.3	48.3	0.43	1.47	20.7*
October 23.....	".....				1.44	21.0*
October 27.....	".....				1.72	17.5*†
November 5.....	".....				1.68	34.3*
November 12.....	".....	41.6	46.6	0.42	1.45	19.7*

* Measurements taken at wading sections.
† Ice Conditions.

DAILY GAUGE HEIGHT AND DISCHARGE of North Branch of Milk River, at Peter's Ranche, for 1910

DAY.	April.		May.		June.		July.	
	Gauge Height.	Dis-charge	Gauge Height.	Dis-charge	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....			1.71	36.0	1.72	29.5	1.69	25.0
2.....			1.70	36.0	1.75	30.5	1.69	25.0
3.....			1.70	37.5	1.76	31.0	1.68	24.5
4.....			1.69	37.5	1.77	32.5	1.68	24.5
5.....			1.67	36.5	1.68	27.5	1.64	22.0
6.....			1.66	35.5	1.66	27.0	1.63	21.5
7.....	1.74	37.0	1.65	34.0	1.73	32.0	1.64	22.5
8.....	1.74	37.0	1.66	33.5	2.21	66.0	1.73	28.5
9.....	1.74	37.0	1.69	34.0	1.85	41.0	1.75	30.5
10.....	1.70	35.0	1.69	33.0	1.76	35.0	1.76	31.0
11.....	1.74	38.5	1.68	31.0	1.68	30.0	1.76	31.5
12.....	1.74	39.0	1.67	30.5	1.66	29.0	1.72	29.0
13.....	1.74	39.5	1.67	32.0	1.72	33.0	1.71	29.0
14.....	1.74	40.0	1.69	33.0	1.75	35.5	1.70	28.5
15.....	1.74	40.5	1.71	35.0	1.77	36.5	1.70	29.0
16.....	1.70	38.5	1.71	37.0	1.80	39.0	1.70	29.5
17.....	1.73	41.0	1.70	35.0	1.81	39.5	1.69	29.0
18.....	1.74	42.5	1.69	35.0	1.73	37.5	1.69	29.5
19.....	1.74	43.0	1.70	36.0	1.70	32.0	1.68	29.0
20.....	1.74	43.5	2.02	58.0	1.71	32.5	1.68	29.5
21.....	1.70	41.5	1.83	44.5	1.70	32.0	1.67	29.0
22.....	1.72	40.5	1.74	37.5	1.70	31.5	1.67	29.5
23.....	1.72	38.5	1.70	34.0	1.69	30.0	1.65	29.0
24.....	1.72	36.5	1.69	28.5	1.68	28.5	1.53	23.0
25.....	1.72	34.5	1.68	30.5	1.67	27.0	1.51	22.0
26.....	1.71	31.0	1.69	31.0	1.67	26.5	1.51	22.0
27.....	1.70	31.5	1.67	29.0	1.68	27.0	1.51	22.0
28.....	1.70	32.5	1.66	28.0	1.68	25.5	1.51	22.0
29.....	1.72	35.0	1.67	28.0	1.69	25.5	1.51	22.0
30.....	1.72	35.5	1.68	28.0	1.69	25.0	1.51	22.0
31.....			1.74	31.0			1.51	22.0

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DAILY GAUGE HEIGHT AND DISCHARGE of North Branch of Milk River at Peter's Ranche, for 1910

Continued.

DAY.	August.		September.		October.		November.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.
1.....	1.51	22.0	1.58	26.0	1.51	22.0	1.44	18.0
2.....	1.51	22.0	1.60	27.5	1.50	21.0	1.52*	22.5
3.....	1.51	22.0	1.62	28.5	1.50	21.0	1.59*	26.5
4.....	1.51	22.0	1.73	35.5	1.50	21.0	1.67	32.0
5.....	1.51	22.0	1.78	39.0	1.50	21.0	1.68	32.5
6.....	1.51	22.0	1.57	25.5	1.50	21.0	1.57*	25.5
7.....	1.51	22.0	1.73	35.5	1.50	21.0	1.44	18.0
8.....	1.50	21.0	1.61	28.0	1.50	21.0	1.46	19.0
9.....	1.50	21.0	1.57	25.5	1.50	21.0	1.56	25.0
10.....	1.50	21.0	1.62	28.5	1.50	21.0	1.69	33.0
11.....	1.50	21.0	1.58	26.0	1.50	21.0	1.58	26.0
12.....	1.50	21.0	1.55	24.5	1.50	21.0	1.52	22.5
13.....	1.50	21.0	1.53	23.0	1.50	21.0	1.60	27.5
14.....	1.51	22.0	1.51	22.0	1.50	21.0	1.60	27.5
15.....	1.56	25.0	1.51	22.0	1.50	21.0	1.66	31.0
16.....	1.55	24.5	1.51	22.0	1.50	21.0	1.57	25.5
17.....	1.53	23.0	1.51	22.0	1.52	22.5	1.67	32.0
18.....	1.51	22.0	1.50	21.0	1.51	22.0	1.63	29.5
19.....	1.51	22.0	1.49	20.5	1.50	21.0	1.63	29.5
20.....	1.50	21.0	1.48	20.0	1.50	21.0	1.61	28.0
21.....	1.48	20.0	1.50	21.0	1.49	20.5	1.61	28.0
22.....	1.46	19.0	1.63	29.5	1.49	20.5	1.61	28.0
23.....	1.51	22.0	1.58	26.0	1.45	18.5	1.59	26.5
24.....	1.49	20.5	1.63	29.5	1.44	18.0	1.58	26.0
25.....	1.50	21.0	1.61	28.0	1.52	22.5	1.59	26.5
26.....	1.50	21.0	1.59	26.5	1.70	33.5	1.63	29.5
27.....	1.49	20.5	1.53	23.0	1.50	21.0	1.67	32.0
28.....	1.47	19.5	1.51	22.0	1.48	20.0	1.67	32.0
29.....	1.47	19.5	1.51	22.0	1.47	19.5	1.67	32.0
30.....	1.47	19.5	1.51	22.0	1.47	19.5	1.67	32.0
31.....	1.45	18.5	.....	.....	1.47	19.5	.....	.....

* Observations have been interpolated.

MONTHLY DISCHARGE of North Branch of Milk River at Peter's Ranche, in 1910.

Drainage area, 109 square miles.

Month.	Discharge in Second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on Drainage area.	Total in acre-feet.
April (7-30).....	43.5	31.0	37.9	0.348	0.311	1,803
May.....	58.0	28.0	34.4	0.316	0.364	2,115
June.....	66.0	25.0	32.5	0.298	0.332	1,934
July.....	31.5	21.5	26.2	0.240	0.277	1,611
August.....	25.0	18.5	21.3	0.195	0.225	1,310
September.....	39.0	20.0	25.7	0.236	0.263	1,529
October.....	33.5	18.0	21.2	0.194	0.224	1,304
November.....	33.0	18.0	27.4	0.251	0.280	1,630
The period.....	.....	.....	.....	.....	.....	13,236

NORTH BRANCH MILK RIVER AT KNIGHT'S RANCHE.

This station was established by F. H. Peters and P. M. Sauder on July 17th, 1909. It is located in Sec. 18, Tp. 2, Rge. 20, W. 4th Mer., almost directly south of the Knight Sugar Co.'s Horse-shoe Ranche buildings. It is about 36 miles by trail from Milk River Station.

The stream flows in one channel about 44 feet wide at ordinary stages. It is straight for about 150 feet above and 100 feet below the station. The right bank is composed of clay, is high and not liable to overflow. The left bank is composed of light sandy loam, is low and liable to overflow to quite a distance during high stages of the stream. The bed of the stream is composed of mud, gravel and boulders.

Discharge measurements are made by means of a cable, car, tagged wire and stay wire. The initial point for soundings is the face of a cedar post on the right bank. Discharge measurements can be made by wading during low water.

The gauge which is a plain staff, graduated to feet and hundredths, is fixed to a post at the right bank. It is referred to the top of the post at the initial point for soundings on the right bank. elevation, 9.30 feet above the datum of the gauge. It was read from 20th April to 27th June, in 1910, by Robt. Orgill, and during the remainder of the season by Wm. Lewis.

DISCHARGE MEASUREMENTS of North Branch of Milk River at Knight's Ranche, in 1910.

Date.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Discharge
1910		<i>Feet.</i>	<i>Sq. ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
April 8.....	L. J. Gleeson.....	42.8	67.2	0.75	1.86	50.7
April 14.....	".....	44.6	68.3	0.77	1.86	52.6
April 20.....	".....	43.0	64.8	0.69	1.89	44.4
April 28.....	".....	42.7	64.3	0.68	1.87	43.9
May 4.....	".....	43.0	63.8	0.63	1.84	40.6
May 11.....	".....	43.1	71.0	0.98	2.03	69.4
May 19.....	".....	43.2	67.6	0.84	1.95	56.9
May 25.....	".....	43.0	63.5	0.70	1.85	44.2
June 1.....	".....	42.6	58.5	0.52	1.71	30.7
June 8.....	".....	43.0	66.2	0.87	1.92	57.5
June 15.....	".....				1.70	27.1*
June 22.....	".....				1.67	25.1*
June 29.....	".....				1.63	22.5*
July 6.....	".....				1.61	21.6*
July 23.....	F. H. Peters.....				1.56	18.3*
July 29.....	".....				1.56	18.4*
August 4.....	".....				1.56	18.3*
August 11.....	".....				1.56	18.8*
August 20.....	N. M. Sutherland.....	41.6	47.2	0.37	1.54	17.5*
August 25.....	".....				1.62	22.2*
September 10.....	".....				1.68	28.2*
September 17.....	".....				1.625	24.2*
September 23.....	".....				1.72	39.0*
September 24.....	".....	42.4	53.4	0.56	1.68	29.7*
September 29.....	".....				1.68	30.5*
October 11.....	".....				1.62	23.5*
October 22.....	".....				1.63	25.4*
October 27.....	".....				1.60	18.3*
November 4.....	".....	42.5	50.8	0.38	1.60	19.3*
November 13.....	".....				1.67	28.0*

* Measurements taken at wading sections.

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DAILY GAUGE HEIGHT AND DISCHARGE of North Branch of Milk River at Knight's Rancho, for 1910

Day.	April.		May.		June.		July.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.ft.</i>	<i>Feet.</i>	<i>Sec.ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....			1.88*	45.0	1.72*	32.5	1.62	22.5
2.....			1.86*	42.5	1.73	35.0	1.62	22.5
3.....			1.85*	41.5	1.76	38.0	1.62	22.5
4.....			1.84*	40.0	1.79	41.5	1.62	22.5
5.....			1.85*	42.5	1.83	46.5	1.61	22.0
6.....			1.84*	42.0	1.86	49.5	1.61*	22.0
7.....			1.83*	41.5	1.89	53.0	1.63	23.5
8.....	1.86*	51.0	1.80*	39.0	1.92*	56.5	1.64*	24.0
9.....	1.86	51.0	1.81*	40.5	1.96*	62.0	1.64	24.0
10.....	1.86	51.5	1.88*	49.5	1.80*	41.5	1.63	23.5
11.....	1.86	51.5	2.00*	65.0	1.78*	39.0	1.63	23.5
12.....	1.86	51.5	1.94*	57.0	1.75*	35.0	1.62	22.5
13.....	1.86	52.5	1.89*	50.5	1.73*	32.5	1.62	22.5
14.....	1.86*	52.5	1.92*	54.5	1.72*	30.0	1.61	22.0
15.....	1.86	50.5	1.95*	58.0	1.70*	27.5	1.61	22.0
16.....	1.86	48.0	1.98*	62.0	1.72*	29.0	1.60	21.0
17.....	1.87	47.0	2.01*	66.5	1.71*	28.5	1.60	21.0
18.....	1.87	45.0	2.04*	69.5	1.70*	27.5	1.59	20.5
19.....	1.88	44.5	2.07*	73.0	1.69*	27.0	1.59	20.5
20.....	1.88*	43.0	2.05*	70.5	1.68*	26.0	1.58	19.5
21.....	1.88*	43.0	2.02*	66.5	1.68*	26.0	1.58	19.5
22.....	1.81*	35.0	1.92*	58.0	1.67*	25.0	1.57	19.0
23.....	1.83*	38.0	1.89*	49.5	1.67*	26.5	1.57*	19.0
24.....	1.87*	42.5	1.87*	46.5	1.67*	26.5	1.57*	19.0
25.....	1.85*	40.5	1.85*	44.0	1.66*	26.0	1.57*	19.0
26.....	1.88*	44.5	1.85*	45.0	1.66*	26.0	1.57*	19.0
27.....	1.87*	44.0	1.84*	44.5	1.66*	26.0	1.57*	19.0
28.....	1.88*	45.0	1.84*	44.5	1.64*	24.0	1.57*	19.0
29.....	1.87*	44.0	1.85*	46.5	1.63	23.5	1.56*	18.0
30.....	1.88*	45.0	1.82*	42.5	1.63	23.5	1.57*	19.0
31.....			1.79*	40.0	.....	.....	1.56*	18.0

* Observations actually made, the others have been interpolated.

DAILY GAUGE HEIGHT AND DISCHARGE of North Branch of Milk River
at Knight's Ranche, for 1910.—Continued.

Day.	August.		September.		October.		November.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.
1.....	1.56*	18.0	1.62*	22.5	1.67	26.5	1.60	21.0
2.....	1.56*	18.0	1.63	23.5	1.66	26.0	1.60	21.0
3.....	1.56*	18.0	1.63	23.5	1.66	26.0	1.60	21.0
4.....	1.56*	18.0	1.64	24.0	1.65	25.0	1.60*	21.0
5.....	1.56*	18.0	1.65	25.0	1.64	24.0	1.61	22.0
6.....	1.56*	18.0	1.65	25.0	1.64	24.0	1.62	22.5
7.....	1.57*	19.0	1.66	26.0	1.64	24.0	1.62	22.5
8.....	1.57*	19.0	1.67	26.5	1.64	24.0	1.63	23.5
9.....	1.57*	19.0	1.67	26.5	1.63	23.5	1.64	24.0
10.....	1.57*	19.0	1.68*	27.5	1.63	23.5	1.65	25.0
11.....	1.56*	18.0	1.68*	27.5	1.62*	22.5	1.65	25.0
12.....	1.56*	18.0	1.67	26.5	1.62	22.5	1.66	26.0
13.....	1.56*	18.0	1.66	26.0	1.62	22.5	1.67*	26.5
14.....	1.56*	18.0	1.65	25.0	1.62	22.5	.....	.....
15.....	1.56*	18.0	1.65	25.0	1.62	22.5	.....	.....
16.....	1.56*	18.0	1.64	24.0	1.62	22.5	.....	.....
17.....	1.56*	18.0	1.63*	23.5	1.63	23.5	.....	.....
18.....	1.56*	18.0	1.63*	23.5	1.63	23.5	.....	.....
19.....	1.56*	18.0	1.65	25.0	1.63	23.5	.....	.....
20.....	1.56*	18.0	1.67	26.5	1.63	23.5	.....	.....
21.....	1.55*	17.5	1.68	27.5	1.63	23.5	.....	.....
22.....	1.55*	17.5	1.70	29.5	1.63*	23.5	.....	.....
23.....	1.55*	17.5	1.72	31.5	1.62	22.5	.....	.....
24.....	1.60*	21.0	1.68	27.5	1.62	22.5	.....	.....
25.....	1.63*	23.5	1.68	27.5	1.61	22.0	.....	.....
26.....	1.65*	25.0	1.68	27.5	1.61	22.0	.....	.....
27.....	1.65*	25.0	1.68	27.5	1.60*	21.0	.....	.....
28.....	1.60*	21.0	1.68	27.5	1.60	21.0	.....	.....
29.....	1.61*	22.0	1.68*	27.5	1.60	21.0	.....	.....
30.....	1.61*	22.0	1.67	26.5	1.60	21.0	.....	.....
31.....	1.62*	22.5	.....	.....	1.60	21.0	.....	.....

* Observations actually made, the others have been interpolated.

MONTHLY DISCHARGE of North Branch of Milk River at Knight's Ranche, for 1910.
Drainage area, 239 square miles.

Month.	Discharge in Second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on Drainage area.	Total in acre-feet.
April (8-30).....	52.5	35.0	46.1	0.193	0.165	2,104
May.....	73.0	39.0	50.9	0.213	0.246	3,130
June.....	62.0	23.5	33.7	0.141	0.157	2,005
July.....	24.0	18.0	21.0	0.088	0.102	1,291
August.....	25.0	17.5	19.3	0.081	0.093	1,187
September.....	31.5	22.5	26.1	0.109	0.122	1,553
October.....	26.5	21.0	23.1	0.096	0.111	1,420
November (1-13).....	26.5	21.0	23.2	0.097	0.052	598
The period.....	.....	.....	.....	.....	.....	13,288

NORTH BRANCH OF MILK RIVER AT MACKIE'S RANCHE.

This station was established July 15th, 1909 ,by P. M. Sauder and F. H. Peters. It is located on the S.W. $\frac{1}{4}$ Sec. 19, Tp. 2, Rge. 18, W. 4th Mer. It is 3 miles north of Mackie Bros. Ranche buildings and is 17 miles by trail from Milk River.

The river flows in one channel which at ordinary stages is about 60 feet wide. It is straight for 200 feet above and about 150 feet below the station. Both banks are low and liable to over-flow at high stages. The bed of the stream is composed of gravel and has a shifting bottom.

Discharge measurements are made by means of a cable, car, tagged wire and stay wire. The initial point for soundings is the face of a cedar post planted in the north bank and marked 0 · 00.

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The gauge which is a plain staff, graduated to feet and hundredths, is fixed to a post at the right bank. It is referred to the top of a post on the right bank; elevation, 8.59 above the datum of the gauge. During 1910, it was read by Mrs. E. R. Lowe.

DISCHARGE MEASUREMENTS of North Branch of Milk River at Mackie's Ranche, in 1910.

Date.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Discharge.
1910		<i>Feet.</i>	<i>Sq.-ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
April 7.....	L. J. Gleeson.....	59.9	89.5	0.65	2.17	58.6
April 14.....	".....	60.5	90.9	0.64	2.19	58.1
April 19.....	".....	60.1	87.9	0.59	2.05	52.2
April 28.....	".....	60.2	84.3	0.54	2.02	45.1
May 3.....	".....	61.2	88.8	0.60	2.06	53.2
May 12.....	".....	60.7	94.7	0.74	2.24	69.9
May 17.....	".....	60.7	93.7	0.70	2.18	67.2
May 26.....	".....	59.8	85.7	0.55	2.03	47.4
May 31.....	".....	59.4	77.6	0.38	1.94	29.7
June 9.....	".....	60.9	102.0	0.81	2.27	82.3
June 15.....	".....				1.87	30.3*
June 23.....	".....				1.84	27.2*
June 29.....	".....				1.80	20.7*
July 7.....	".....				1.77	21.6*
July 22.....	F. H. Peters.....				1.75	17.4*
July 30.....	".....				1.72	17.8*
August 4.....	".....				1.73	17.4*
August 12.....	".....				1.74	18.3*
August 20.....	N. M. Sutherland.....				1.76	19.3*
September 11.....	".....				1.905	32.5*
September 17.....	".....				1.83	26.7*
September 25.....	".....				1.90	32.0*
September 29.....	".....				1.91	34.5*
October 12.....	".....				1.80	24.2*
October 22.....	".....				1.85	26.6*
October 28.....	".....	60.7	77.4	0.49	1.93	37.6*
November 4.....	".....				1.76	20.6*
November 14.....	".....				1.74	14.8*

* Measurements taken at wading sections.

DAILY GAUGE HEIGHT AND DISCHARGE of N. Branch of Milk River at Mackie's Ranche, for 1910

DAY.	April.		May.		June.		July.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	2.17*	58.5	2.05	51.2	1.93	30.8	1.71	15.8
2.....	2.17	58.5	2.06	52.5	1.92	29.8	1.72	16.8
3.....	2.17*	58.5	2.06*	53.2	1.91	29.5	1.73	17.5
4.....	2.17	58.5	2.06	51.2	1.90	29.2	1.74	18.2
5.....	2.17	58.5	2.06	50.5	1.89	28.5	1.75	19.5
6.....	2.17*	58.5	2.06	49.2	1.87*	26.8	1.76	20.5
7.....	2.17*	58.5	2.06*	48.2	1.91	30.0	1.77*	21.5
8.....	2.17	58.5	2.09	51.2	1.95	34.8	1.76	20.8
9.....	2.17	56.8	2.13	56.2	2.27	82.2	1.75	20.0
10.....	2.17	56.8	2.16	59.8	1.91	32.8	1.75	19.8
11.....	2.17*	56.8	2.20	64.8	1.90	31.2	1.75	19.8
12.....	2.17	54.8	2.24*	70.0	1.89	32.0	1.75	19.5
13.....	2.17*	54.8	2.23	70.0	1.88	31.8	1.75	19.5
14.....	2.20*	59.5	2.22	69.5	1.87	31.2	1.75	19.2
15.....	2.17	57.8	2.21	69.2	1.87	30.2	1.75	19.0
16.....	2.14	56.2	2.20	69.0	1.87	30.2	1.75*	18.8
17.....	2.11	55.0	2.18*	67.0	1.87	30.2	1.75	18.8
18.....	2.08	53.5	2.16	64.8	1.87*	30.2	1.75	18.5
19.....	2.05*	52.2	2.14	61.8	1.86	29.2	1.74	17.5
20.....	2.05	51.5	2.10	59.0	1.86	29.8	1.74	17.8
21.....	2.05	51.5	2.10	56.5	1.85	28.0	1.73	16.8
22.....	2.05	51.2	2.08	53.5	1.85	28.0	1.72*	15.8
23.....	2.04	49.2	2.06	51.0	1.84*	27.0	1.72	16.0
24.....	2.04	48.8	2.04*	48.8	1.82	25.0	1.72	16.2
25.....	2.04	48.5	2.04	48.5	1.79	22.0	1.72*	16.5
26.....	2.04*	48.5	2.03*	47.5	1.76	19.5	1.72	17.0
27.....	2.03	46.8	2.01	43.8	1.73	17.2	1.72	17.0
28.....	2.02*	45.0	2.00	41.0	1.70*	15.2	1.72	17.2
29.....	2.03	47.0	1.98	37.2	1.70*	14.8	1.72	17.5
30.....	2.04	49.0	1.96	33.8	1.70	15.0	1.72	17.8
31.....			1.94*	29.8			1.72	17.2

* Observations actually made; the others are interpolated.

DAILY GAUGE HEIGHT AND DISCHARGE of N. Branch of Milk River at Mackie's Ranche, for 1910.
Continued.

DAY.	August.		September.		October.		November.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	1.72	17.2	1.88	28.5	1.90	33.8	1.85	29.2
2.....	1.73	17.8	1.89	29.5	1.90	34.0	1.82	26.2
3.....	1.73	17.8	1.90	30.5	1.89	33.0	1.79	23.5
4.....	1.73*	17.8	1.91	31.5	1.88	32.0	1.76*	20.5
5.....	1.73	17.8	1.92	32.5	1.87	30.8	1.76	20.2
6.....	1.73	17.8	1.93	33.5	1.86	29.8	1.76	20.0
7.....	1.73	17.8	1.95*	36.0	1.85	28.8	1.76	19.5
8.....	1.74	18.2	1.94	34.8	1.84	28.0	1.76	19.0
9.....	1.74	18.2	1.93	33.5	1.83	26.2	1.76	18.5
10.....	1.74	18.2	1.92	32.5	1.82	26.0	1.75	17.5
11.....	1.74	18.2	1.90*	32.5	1.81	25.0	1.75	16.8
12.....	1.74*	18.2	1.89	31.0	1.80*	24.2	1.75	16.5
13.....	1.74	18.2	1.88	30.5	1.80	24.0	1.74	15.5
14.....	1.74	18.2	1.87	29.5	1.80	24.0	1.74*	14.8
15.....	1.75	18.8	1.86	29.0	1.81	24.5	.....	.....
16.....	1.75	18.8	1.85	28.2	1.82	25.0	.....	.....
17.....	1.75	18.8	1.83*	26.5	1.83	25.8	.....	.....
18.....	1.76	19.5	1.83	26.5	1.84	26.5	.....	.....
19.....	1.76	19.5	1.84	27.0	1.85	27.2	.....	.....
20.....	1.76*	19.5	1.85	28.0	1.85	26.8	.....	.....
21.....	1.77	20.0	1.86*	28.8	1.85	26.8	.....	.....
22.....	1.78	20.8	1.87	29.2	1.85*	26.5	.....	.....
23.....	1.79	21.5	1.88	30.2	1.86	27.8	.....	.....
24.....	1.80	22.0	1.89	30.8	1.87	29.5	.....	.....
25.....	1.81	22.8	1.90*	32.0	1.88	31.2	.....	.....
26.....	1.82	23.5	1.90	32.5	1.89	31.8	.....	.....
27.....	1.83	24.2	1.90	32.8	1.91	34.5	.....	.....
28.....	1.84	25.0	1.91	34.2	1.93*	37.5	.....	.....
29.....	1.85	26.0	1.91*	34.5	1.91	35.0	.....	.....
30.....	1.86	26.8	1.91	34.8	1.89	33.2	.....	.....
31.....	1.87	27.5	.....	.....	1.87	30.8	.....	.....

* Observations actually made; the others are interpolated.

MONTHLY DISCHARGE of North Branch of Milk River at Mackie's Ranche, for 1910.
Drainage area, 435 square miles.

Month.	Discharge in Second-Feet.			Run-Off.		
	Maximum.	Minimum.	Mean.	Per square mile	Depth in inches on Drainage area.	Total in acre-feet.
April.....	59.5	45.0	54.0	0.124	0.138	3,213
May.....	70.0	29.8	54.2	0.125	0.144	3,333
June.....	82.2	14.8	29.1	0.067	0.075	1,732
July.....	21.5	15.8	18.2	0.042	0.048	1,119
August.....	27.5	17.2	20.2	0.046	0.053	1,242
September.....	36.0	26.5	31.0	0.071	0.079	1,845
October.....	37.5	24.0	29.0	0.067	0.077	1,783
November (1-14).....	29.2	14.8	19.84	0.046	0.024	551
The period.....						14,818

SOUTH BRANCH OF MILK RIVER AT MACKIE'S RANCHE.

This station was established July 14th, 1909, by P. M. Sauder and F. H. Peters. It is 17 miles by trail from Milk River and is located on Sec. 31, Tp. 1, Rge. 18, W. 4th Mer., about $\frac{1}{4}$ mile upstream from Mackie Bros.' ranche buildings.

The stream flows in one channel straight for about 150 feet above the station and is straight for 100 feet below. The right bank is composed of sand and gravel and is liable to overflow. The left bank is composed of clay and is high. The bed of the stream consists of gravel and sand and is liable to shift.

Discharge measurements are made by means of a cable, car, tagged wire and stay wire. The initial point for soundings is the face of a cedar post planted in the left bank.

The gauge, which is a plain staff, graduated to feet and hundredths, is fixed to a post at the left bank. It is referred to the top of the post at the initial point for soundings, elevation, 13.25 above the datum of the gauge. During 1910, it was read by Mrs. E. R. Lowe and Mrs. Wm. Knox.

DISCHARGE MEASUREMENTS of South Branch of Milk River at Mackie's Ranche, in 1910.

Date.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Discharge.
		<i>Feet.</i>	<i>Sq. ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
April 6.....	L. J. Gleeson.....	68.5	70.9	1.12	2.56	79.3
April 15.....	".....	86.1	112.6	1.53	3.00	172
April 19.....	".....	86.1	96.5	1.38	2.85	133
April 29.....	".....	87.5	100.6	1.43	2.90	144
May 3.....	".....	86.9	84.6	1.29	2.72	109
May 13.....	".....	86.4	104.6	1.48	2.92	155
May 17.....	".....	86.4	93.6	1.37	2.83	128
May 27.....	".....	86.2	85.3	1.21	2.71	104
May 31.....	".....	85.4	71.7	1.04	2.53	74.6
June 10.....	".....	87.5	130.0	1.86	3.23	242
June 13.....	".....	67.6	68.0	1.07	2.51	72.9
June 24.....	".....	60.0	51.2	0.78	2.24	40.0
June 27.....	".....	57.9	48.3	0.77	2.18	37.3
July 8.....	".....	55.6	40.0	0.55	2.03	22.3
July 21.....	F. H. Peters.....				1.75	4.67*
July 30.....	".....				1.64	2.02*
August 3.....	".....				1.61	1.44*
August 12.....	".....				1.71	3.50*
August 19.....	N. M. Sutherland.....				1.62	1.29*
September 11.....	".....	60.0	46.4	0.93	2.21	43.3*
September 17.....	".....				2.05	31.1*
September 25.....	".....				2.17	43.5*
September 28.....	".....				2.14	36.3*
October 12.....	".....	57.2	38.8	0.74	2.05	28.6*
October 21.....	".....				2.07	29.4*
October 28.....	".....				2.02	24.2*
November 14.....	".....				2.14	35.2*

* Measurements taken at wading sections

DAILY GAUGE HEIGHT AND DISCHARGE of South Branch of Milk River, at Mackie's Ranche, for 1910.

Day.	April.		May.		June.		July.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	2.61	87.5	2.79	120.0	2.53	76.0	2.20	41.0
2.....	2.62	89.0	2.75	112.0	2.49	71.0	2.12	34.0
3.....	2.66	95.0	2.72	106.0	2.44	65.0	2.07	30.0
4.....	2.61	87.5	2.67*	97.0	2.42	62.5	2.04	27.5
5.....	2.57	81.5	2.62*	89.0	2.48	69.5	2.02	25.5
6.....	2.56	80.0	2.56	80.0	2.46	67.0	2.02*	25.5
7.....	2.67	97.0	2.57	81.5	2.43	64.0	2.03	26.5
8.....	2.91	148.5	2.57	81.5	2.82	126.5	2.03	26.5
9.....	2.91	148.5	2.55	79.0	2.94	156.5	2.02	25.5
10.....	2.93	154.0	2.70	102.5	3.23	242.0	2.04	27.5
11.....	3.01	176.5	2.70	102.5	2.94	156.5	2.01	25.0
12.....	3.21	236.5	2.95	159.5	2.66	95.5	1.98	22.5
13.....	3.11	206.0	2.91	148.5	2.53	76.0	1.94	19.5
14.....	3.22	239.5	2.83	128.5	2.45	66.0	1.91	17.0
15.....	3.01	176.5	2.77	115.5	2.43	64.0	1.89	15.5
16.....	2.81	124.5	2.85	133.0	2.40	60.5	1.85	12.5
17.....	2.84	131.0	2.87	138.0	2.37	57.5	1.80	9.5
18.....	2.84	131.0	3.23	242.0	2.35	55.5	1.79	8.9
19.....	2.85	133.0	3.08	197.0	2.33	53.5	1.76	7.3
20.....	2.83	128.5	3.00	173.5	2.29	49.5	1.74	6.2
21.....	2.97	165.0	3.17	224.5	2.25	45.5	1.74	6.2
22.....	2.98	167.5	3.00	173.5	2.25	45.5	1.71	4.7
23.....	2.85	133.0	2.84	131.0	2.23	44.0	1.68	3.5
24.....	2.77	115.5	2.75	112.0	2.23	44.0	1.66	2.6
25.....	2.77	115.5	2.71	104.0	2.21	42.0	1.65	2.2
26.....	2.84	131.0	2.70	102.5	2.22	43.0	1.65	2.2
27.....	2.86	135.5	2.67	97.0	2.19	40.0	1.65	2.2
28.....	2.86	135.5	2.64	92.0	2.14	35.5	1.65	2.2
29.....	2.91	148.5	2.58	83.0	2.12	34.0	1.65	2.2
30.....	2.85	133.0	2.54	77.5	2.13	35.0	1.64	2.0
31.....			2.52	75.0			1.63	1.6

* Observations have been interpolated.

DAILY GAUGE HEIGHT AND DISCHARGE of South Branch of Milk River at Mackie's Ranche, for 1910.—Continued.

Day.	August.		September.		October.		November.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.
1.....	1.62	1.4	1.85	12.5	2.15	36.5	2.13	35.0
2.....	1.61	1.0	1.87	14.0	2.13	35.0	2.06	29.0
3.....	1.62*	1.4	1.89	15.5	2.13	35.0	2.08	30.5
4.....	1.63	1.6	1.99*	23.5	2.12*	34.0	2.10	32.5
5.....	1.63	1.6	2.09*	31.5	2.11	33.5	2.10	32.5
6.....	1.64	2.0	2.19	40.0	2.08	30.5	2.01	25.0
7.....	1.64	2.0	2.23	44.0	2.06	29.0	2.07	30.0
8.....	1.64	2.0	2.25	45.5	2.09	31.5	2.13	35.0
9.....	1.64	2.0	2.21	42.0	2.07	30.0	2.15	36.5
10.....	1.64	2.0	2.18	39.5	2.08	30.5	2.14	35.5
11.....	1.67	3.1	2.18	39.5	2.07	30.0	2.14	35.5
12.....	1.70	4.2	2.16	37.5	2.05	28.0	2.14	35.5
13.....	1.71	4.7	2.14	35.5	2.07	30.0	2.16	37.5
14.....	1.70	4.2	2.13	35.0	2.06	29.0	2.33	53.5
15.....	1.68	3.5	2.08	30.5	2.05	28.0	2.26	46.5
16.....	1.65	2.2	2.06	29.0	2.04	27.5	2.17	38.5
17.....	1.63	1.6	2.03	26.5	2.04	27.5	2.18	39.5
18.....	1.63	1.6	2.01	25.0	2.03	26.5	2.27	47.5
19.....	1.63	1.6	1.98	22.5	2.04	27.5	2.18	39.5
20.....	1.68	3.5	1.91	17.0	2.05	28.0	2.24	44.5
21.....	1.73	5.8	1.93	18.5	2.06	29.0	2.19	40.0
22.....	1.73	5.8	1.92	17.5	2.07	30.0	2.15	36.5
23.....	1.71	4.7	1.96	21.0	2.07	30.0	2.18	39.5
24.....	1.71	4.7	1.98	22.5	2.04	27.5	2.31	51.5
25.....	1.73	5.8	2.08	30.5	2.05	28.0	2.36	56.5
26.....	1.73	5.8	2.18	39.5	2.06	29.0	2.09	31.5
27.....	1.78*	8.4	2.26	46.5	2.06	29.0	2.08	30.5
28.....	1.82*	11.0	2.24	44.5	2.04	27.5	.....	.....
29.....	1.87	14.0	2.18	39.5	2.00	24.0	.....	.....
30.....	1.85	12.5	2.16	37.5	2.07	30.0	.....	.....
31.....	1.83	11.5	.....	.....	2.13	35.0	.....	.....

* Observations have been interpolated.

MONTHLY DISCHARGE of South Branch of Milk River at Mackie's Ranche, for 1910.

Drainage area, 441 square miles.

Month.	Discharge in Second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on Drainage area.	Total in acre-feet.
April.....	239.5	80.0	137.7	0.312	0.348	8,195
May.....	242.0	75.0	121.2	0.275	0.317	7,452
June.....	242.0	34.0	71.4	0.162	0.181	4,248
July.....	41.0	1.6	15.0	0.034	0.039	922
August.....	14.0	1.0	4.43	0.010	0.012	272
September.....	46.5	12.5	30.8	0.070	0.081	1,833
October.....	36.5	24.0	29.9	0.068	0.078	1,838
November (1-27).....	56.5	25.0	37.98	0.086	0.086	2,033
The period.....	.....	.....	.....	.....	.....	24,760

MILK RIVER, AT MILK RIVER.

This station was established by H. C. Ritchie on May 18th, 1909, and re-established by F. H. Peters on July 3rd, 1909. It is located on Sec. 28, Tp. 2, Rge. 16, W. 4th Mer., at the A. R. & I. railway bridge, $\frac{1}{4}$ mile south of the town of Milk River.

Discharge measurements are made from the down stream side of the bridge at high water and in low water a wading section, about 50 feet upstream is used.

The stream flows in one channel at all stages and in ordinary stages is not more than 140 feet wide. The channel is almost straight for 500 feet above and below the station. The right bank is sandy, fairly high, and not liable to overflow. The left bank is lower and overflows during high water. The bed of the stream is composed of sand and shifts during all stages.

The gauge, which is a plain staff, graduated to feet and hundredths, is nailed to an old bridge pile about 12 feet above the present bridge. It is referred to the top of a cedar post on the south bank of the river, about 50 feet above the bridge; elevation, 15.90. As this gauge is liable to be carried out by ice or flood water, a chain gauge has been attached to the bridge and will be read if the staff goes out. The datum of the chain gauge is the same as that of the staff. The gauge was read once each day by D. O'Connell, the A. R. & I. Co.'s section foreman at Milk River.

DISCHARGE MEASUREMENTS of Milk River at Milk River, in 1910.

Date.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Discharge.
1910		<i>Feet.</i>	<i>Sq. ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
April 18.....	L. J. Gleeson.....	126.1	123.6	1.45	1.72	179
May 2.....	".....	126.2	130.5	1.37	1.74	180
May 10.....	F. H. Peters.....	124.0	102.8	1.32	1.55	136
May 16.....	L. J. Gleeson.....	128.2	133.6	1.41	1.80	189
May 28.....	".....	125.5	107.0	1.28	1.62	137
May 30.....	N. M. Sutherland.....	123.3	93.4	1.30	1.50	122
June 11.....	L. J. Gleeson.....	128.6	153.2	1.54	2.00	236
June 13.....	".....	123.2	96.9	1.28	1.52	125
June 21.....	N. M. Sutherland.....	119.6	64.0	1.24	1.25	79.2
June 25.....	L. J. Gleeson.....				1.18	64.6*
June 27.....	".....				1.18	63.0*
July 4.....	N. M. Sutherland.....	116.4	45.2	1.04	1.08	47.2*
July 9.....	L. J. Gleeson.....				1.05	40.3*
July 18.....	N. M. Sutherland.....	112.7	23.2	0.99	0.86	22.9*
July 21.....	F. H. Peters.....				0.83	20.9*
August 1.....	".....				0.73	13.1*
August 10.....	N. M. Sutherland.....	110.4	19.6	0.85	0.76	16.6*
August 16.....	F. H. Peters.....				0.76	19.7*
August 22.....	L. J. Gleeson.....				0.74	17.2*
September 12.....	G. H. Whyte.....				1.19	65.0*
September 26.....	".....				1.09	57.4*
October 10.....	".....				1.02	42.8*
October 21.....	N. M. Sutherland.....				1.05	52.9*
October 29.....	".....				1.06	57.2*
October 31.....	".....	116.6	55.2	0.95	1.06	52.2*
November 4.....	G. H. Whyte.....				1.045	43.9*
November 4.....	".....				1.055	45.3*

* Measurements made at wading stations.

DAILY GAUGE HEIGHT AND DISCHARGE of Milk River, at Milk River, for 1910.

DAY.	April.		May.		June.		July.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	1.50	130.0	1.70	169.5	1.40	101.5	1.10	51.0
2.....	1.70	173.5	1.70	169.5	1.40	101.5	1.11	52.0
3.....	1.70	173.5	1.70	169.5	1.40	101.5	1.10	50.0
4.....	1.70	173.5	1.70	169.5	1.40	101.5	1.09	48.5
5.....	1.70	173.5	1.62	151.5	1.40	101.5	1.08	46.5
6.....	1.70	173.5	1.60	147.0	1.40	101.5	1.06	43.5
7.....	1.70	173.5	1.51	127.0	1.33	88.5	1.04	40.0
8.....	1.83	204.0	1.50	125.0	1.37	96.0	1.02	37.0
9.....	1.90	221.0	1.42	108.5	1.40	101.5	1.01	35.5
10.....	1.81	199.5	1.62	151.0	2.29	304.0	1.02	37.5
11.....	1.98	238.5	1.70	169.5	1.90	211.5	1.01	36.5
12.....	2.08	264.0	1.86	205.0	1.64	152.5	1.00	35.5
13.....	2.03	254.5	1.90	214.0	1.50	122.0	1.00	36.5
14.....	2.00	245.0	1.85	201.0	1.50	122.5	0.99	35.0
15.....	2.07	260.5	1.74	175.0	1.40	104.0	0.98	34.5
16.....	2.01	247.0	1.86	202.5	1.32	90.0	0.97	33.0
17.....	1.79	195.0	1.90	210.5	1.30	86.5	0.96	32.5
18.....	1.80	197.5	1.97	226.5	1.30	87.0	0.95	31.0
19.....	1.82	201.5	2.08	252.0	1.30	87.5	0.91	27.0
20.....	1.90	220.5	2.07	248.5	1.26	81.0	0.85	22.5
21.....	1.90	219.5	2.08	250.0	1.25	79.0	0.84	21.5
22.....	1.90	219.5	2.02	235.0	1.25	78.5	0.82	20.0
23.....	1.86	210.0	1.86	196.0	1.21	71.0	0.80	18.5
24.....	1.85	206.5	1.71	165.5	1.20	68.5	0.78	17.5
25.....	1.73	179.0	1.70	157.5	1.20	68.0	0.77	17.0
26.....	1.70	172.0	1.70	156.5	1.20	67.5	0.75	15.0
27.....	1.77	187.0	1.70	155.5	1.12	54.0	0.74	14.5
28.....	1.80	194.0	1.63	139.0	1.10	50.5	0.74	14.5
29.....	1.84	203.0	1.50	117.0	1.10	50.5	0.74	14.0
30.....	1.81	195.0	1.51	124.0	1.10	51.0	0.73	13.5
31.....			1.43	106.0			0.75	14.5

DAILY GAUGE HEIGHT AND DISCHARGE of Milk River, at Milk River, for 1910.—Continued.

DAY.	August.		September.		October.		November.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.
1.....	0.73	13.0	0.91	34.5	1.13	63.0	1.20	72.5
2.....	0.73	13.0	0.90	33.0	1.11	58.5	1.16	64.0
3.....	0.73	13.0	0.90	33.0	1.10	57.0	1.10	53.0
4.....	0.73	13.5	0.98	42.0	1.03	46.5	1.09	49.5
5.....	0.73	13.5	1.03	48.0	1.07	51.5	1.05	.....
6.....	0.73	13.5	1.05	50.5	1.06	50.0	1.05	.....
7.....	0.74	14.5	1.22	75.5	1.06	50.0	1.05	.....
8.....	0.77	17.0	1.27	83.5	1.04	46.0	1.08	.....
9.....	0.79	18.0	1.25	79.0	1.04	45.5	1.13	.....
10.....	0.79	18.0	1.24	76.5	1.04	45.5	1.43	.....
11.....	0.78	18.5	1.23	74.0	1.05	47.5	1.42	.....
12.....	0.78	18.5	1.21	68.0	1.05	48.0	1.17	.....
13.....	0.80	21.0	1.19	65.0	1.05	48.5	1.03	.....
14.....	0.79	20.5	1.17	61.5	1.05	49.0	1.36	.....
15.....	0.80	22.0	1.15	59.5	1.03	47.0	1.27	.....
16.....	0.80	23.0	1.11	54.0	1.04	48.5	1.28	.....
17.....	0.78	21.0	1.09	51.5	1.04	49.0	1.46	.....
18.....	0.78	21.0	1.04	45.0	1.05	51.0	1.42	.....
19.....	0.80	22.0	1.00	41.5	1.05	51.5	1.34	.....
20.....	0.78	20.5	0.98	38.5	1.06	54.0	1.35	.....
21.....	0.77	19.5	1.00	41.5	1.08	57.5	1.39	.....
22.....	0.78	20.0	1.00	42.0	1.06	54.5	1.40	.....
23.....	0.79	22.0	0.98	40.0	1.05	53.5	1.40	.....
24.....	0.78	22.0	1.05	50.5	1.05	54.0	1.28	.....
25.....	0.80	22.5	1.09	57.0	1.03	50.5	1.28	.....
26.....	0.83	26.5	1.11	60.5	1.03	51.0	1.28	.....
27.....	0.83	27.0	1.13	63.0	1.13	68.0	1.27	.....
28.....	0.87	31.0	1.13	63.0	1.37	110.5	1.23	.....
29.....	0.90	34.0	1.11	59.5	1.04	54.0	1.20	.....
30.....	0.90	34.0	1.13	62.5	1.06	54.5	1.12	.....
31.....	0.91	34.5	.....	.....	1.09	56.5	.....	.....

MONTHLY DISCHARGE of Milk River, at Milk River, for 1910.

Drainage area, 1,077 square miles.

Month.	Discharge in Second-Feet.				Run-Off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on Drainage area.	Total in acre-feet.
April.....	264.0	130.0	203.5	0.189	0.211	12,109
May.....	252.0	106.0	174.0	0.162	0.186	10,700
June.....	304.0	50.5	99.4	0.092	0.103	5,915
July.....	52.0	13.5	30.5	0.028	0.033	1,875
August.....	34.5	13.0	20.9	0.019	0.022	1,285
September.....	83.5	33.0	55.1	0.051	0.057	3,279
October.....	110.5	45.5	53.9	0.051	0.059	3,314
The period.....	.....	.....	.....	.....	.....	38,477

MILK RIVER, AT WRITING-ON-STONE POLICE DETACHMENT.

This station was established on August 2nd, 1909, by F. H. Peters. It is located at the R. N. W. M. P. Post at Writing-on-Stone in the N.W. $\frac{1}{4}$ Sec. 35, Tp. 1, Rge. 13, W. 4th Mer. It is 17 miles by trail from Coutts and 26 miles from Milk River station.

The river flows in one channel at all stages. It is straight for 300 feet above and 250 feet below the station. Both banks are slightly wooded, high and not liable to overflow except in extreme flood stages of the stream. The bed of the stream is composed of sand which is constantly shifting.

Discharge measurements are made by means of a cable, car, tagged wire and stay wire. The initial point for soundings is 50 feet south of the B. M. post on the right bank. During very low stages of the stream wading sections may be used.

The gauge, which is a plain staff, graduated to feet and hundredths, is fixed to a post at the right bank. It is referred to the top of a cedar post on the right bank, elevation 13.73 feet above the datum of the gauge. It was read during 1910 by Constable A. P. White.

DISCHARGE MEASUREMENTS of Milk River at Writing-on-Stone Police Detachment, in 1910.

DATE	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Dis-charge.
		<i>Feet.</i>	<i>Sq.-ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
April 10.....	F. H. Peters.....	126.6	116.4	1.87	2.31	218
April 20.....	N. M. Sutherland.....	126.2	119.2	1.68	2.19	200
April 29.....	".....	126.6	116.1	1.84	2.22	214
May 4.....	".....	126.4	108.4	1.63	2.115	176
May 11.....	F. H. Peters.....	125.6	117.3	1.36	2.07	159
May 18.....	N. M. Sutherland.....	126.6	130.2	1.70	2.31	221
May 21.....	".....	126.6	145.6	1.70	2.445	248
May 28.....	".....	126.7	104.6	1.43	2.13	150
May 31.....	".....	125.9	100.6	1.32	2.01	133
June 10.....	F. H. Peters.....	65.4	71.8	1.48	1.98	106 *
June 17.....	N. M. Sutherland.....				1.79	77.8*
June 22.....	".....				1.74	79.6*
June 29.....	".....				1.595	49.9*
July 4.....	".....	121.8	42.8	1.17	1.60	50.2*
July 9.....	F. H. Peters.....				1.52	41.0*
July 19.....	".....	37.1	24.2	0.90	1.27	21.7
July 20.....	N. M. Sutherland.....				1.155	19.9*
August 6.....	".....				1.14	14.6*
August 6.....	".....				1.14	14.6*
August 10.....	".....	36.7	18.7	0.71	1.155	13.2*
August 11.....	".....	36.8	19.6	0.80	1.165	15.6
August 16.....	".....	37.1	16.6	0.94	1.195	15.6
August 17.....	".....				1.215	16.6*
August 22.....	L. J. Gleeson.....				1.14	15.5*
August 27.....	".....				1.24	20.3*
September 15.....	G. H. Whyte.....				1.745	62.2*
September 22.....	".....				1.56	33.3*
September 29.....	".....				1.72	57.1*
October 6.....	".....				1.65	53.7*
October 10.....	".....				1.61	45.2*
October 15.....	".....				1.60	43.7*
October 23.....	".....				1.65	47.8*
October 30.....	".....				1.63	50.1*
November 6.....	".....	114.7	50.4	1.19	1.74	59.9*
November 14.....	".....	35.0	28.4	0.95	1.485	27.0*

* Measurements taken at wading sections.

SESSIONAL PAPER No. 25d

DAILY GAUGE HEIGHT AND DISCHARGE of Milk River, at Writing-on-Stone
Police Detachment, for 1910.

DAY.	April.		May.		June.		July.	
	Gauge Height.	Dis- charge.	Gauge Height.	Dis- charge.	Gauge Height.	Dis- charge.	Gauge Height.	Dis- charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	2.08	140.0	2.22	213.0	2.00	128.5	1.59	50.0
2.....	2.12	153.5	2.20	206.0	1.99	124.0	1.58	49.0
3.....	2.13	157.0	2.14	185.0	2.02	132.5	1.63	55.5
4.....	2.11	150.0	2.12	177.5	1.97	117.0	1.69	65.0
5.....	2.10	147.5	2.10	170.5	1.97	112.5	1.54	45.0
6.....	2.10	147.5	2.06	156.5	1.97	110.5	1.55	45.5
7.....	2.05	131.0	2.00	136.0	1.97	109.0	1.60	51.0
8.....	2.07	137.0	1.89	101.5	1.98	110.0	1.55	44.5
9.....	2.25	197.5	1.82	84.0	1.97	105.0	1.52	41.0
10.....	2.32	222.0	1.98	128.5	2.08	138.0	1.51	40.5
11.....	2.32	224.5	2.07	159.0	2.55	307.5	1.49	39.0
12.....	2.42	259.5	2.07	155.5	2.29	217.5	1.48	38.0
13.....	2.44	270.5	2.23	208.5	2.15	174.5	1.46	36.5
14.....	2.44	270.0	2.32	236.5	2.03	139.0	1.44	34.5
15.....	2.46	279.5	2.29	222.5	1.87	93.0	1.41	32.0
16.....	2.42	268.5	2.21	192.5	1.84	87.5	1.39	30.5
17.....	2.24	210.5	2.26	207.0	1.81	82.5	1.36*	28.0
18.....	2.15	189.5	2.32	229.0	1.80	82.5	1.33*	25.5
19.....	2.17	190.5	2.34	225.0	1.80	85.0	1.31	24.0
20.....	2.17	193.5	2.51	274.5	1.78	83.5	1.28	27.0
21.....	2.22	211.0	2.43	243.5	1.74	77.0	1.26*	25.0
22.....	2.24	217.5	2.54	278.5	1.72	75.0	1.24*	24.0
23.....	2.25	222.0	2.48	260.5	1.77	86.5	1.22	22.0
24.....	2.27	229.5	2.32	209.5	1.75	81.5	1.21	21.5
25.....	2.23*	216.5	2.21	173.0	1.74	78.5	1.18	19.5
26.....	2.20*	206.0	2.16	158.5	1.70	70.0	1.15	18.0
27.....	2.17	196.5	2.12	145.0	1.67	63.5	1.12	17.0
28.....	2.27	231.0	2.12	146.5	1.68	63.0	1.13	16.5
29.....	2.22	214.0	2.11	151.5	1.62	53.0	1.13	16.0
30.....	2.24	221.5	2.06	142.5	1.60	50.5	1.14	16.5
31.....			2.01	133.0			1.13	15.5

* Observations have been interpolated.

DAILY GAUGE HEIGHT AND DISCHARGE of Milk River at Writing-on-Stone
Police Detachment, for 1910.—*Continued.*

DAY.	August.		September.		October.		November.	
	Gauge Height.	Dis- charge.	Gauge Height.	Dis- charge.	Gauge Height.	Dis- charge.	Gauge Height.	Dis- charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	1.13	15.5	1.43	35.5	1.70	56.5	1.70	56.5
2.....	1.10	14.0	1.45	37.5	1.69	56.0	1.67	51.0
3.....	1.11	14.0	1.51	43.5	1.68	55.5	1.70	53.5
4.....	1.11	14.0	1.52	44.5	1.66	53.5	1.72	55.0
5.....	1.12	13.5	1.54	46.5	1.65	53.0	1.71	52.5
6.....	1.16	15.0	1.57	49.5	1.64	52.5	1.68	47.5
7.....	1.14	14.0	1.66	61.5	1.62	49.0	1.64	44.0
8.....	1.14	13.5	1.67	62.0	1.62*	48.0	1.65	45.5
9.....	1.15	13.5	1.73	68.0	1.59	44.0	1.69	49.5
10.....	1.16	13.5	1.82	90.0	1.60	44.0	1.61	41.0
11.....	1.17	15.5	1.82	86.5	1.61	45.5	1.64	43.0
12.....	1.19	16.5*	1.79*	77.0	1.60	44.5	1.78	59.5
13.....	1.18	15.5	1.77	71.0	1.61	45.5	1.70	47.0
14.....	1.18	15.5	1.77	69.0	1.59	43.5	1.16	.....
15.....	1.18	15.0	1.74	61.5	1.60	44.5	1.10	.....
16.....	1.19	15.5	1.70	55.0	1.62	46.5	1.44	.....
17.....	1.21	17.0	1.68	52.0	1.62	47.0	1.26	.....
18.....	1.22	17.5	1.65	48.0	1.64	49.0	1.95	.....
19.....	1.23	18.5	1.62	43.5	1.65	51.5	2.07	.....
20.....	1.19	17.5	1.58	38.5	1.63	49.5	2.07	.....
21.....	1.19	17.5	1.58	37.0	1.63	50.0	1.91	.....
22.....	1.19	17.5	1.54	32.0	1.63	50.0	1.74	.....
23.....	1.17	17.0	1.52	31.5	1.65	53.0	1.63	.....
24.....	1.18	17.5	1.56	36.0	1.65	53.0*	1.77*	.....
25.....	1.19	18.0	1.61	41.5	1.64	51.5	1.89	.....
26.....	1.24	20.0	1.65	46.5	1.64	51.5	1.56	.....
27.....	1.25	20.5*	1.68*	51.0	1.53	40.0	1.85	.....
28.....	1.28	23.0	1.71	55.0	1.24	20.0	1.75	.....
29.....	1.34	27.0	1.70	54.5	1.64	51.0	1.75	.....
30.....	1.36	29.0	1.70	55.5	1.67	55.0	1.88	.....
31.....	1.41	33.5	.....	.....	1.69	56.5	.....	.....

* Observations have been interpolated.

MONTHLY DISCHARGE of Milk River at Writing-on-Stone Police Detachment, for 1910.

Drainage area, 1,620 square miles.

Month.	Discharge in Second-Feet.			Run-Off.		
	Maximum.	Minimum.	Mean.	Per square Mile.	Depth in inches on Drainage area.	Total in acre-feet
April.....	279.5	131.0	206.8	0.127	0.141	12,305
May.....	278.5	84.0	184.2	0.114	0.131	11,326
June.....	307.5	50.5	107.9	0.067	0.075	6,420
July.....	65.0	15.5	32.7	0.020	0.023	2,011
August.....	33.5	13.5	17.6	0.011	0.013	1,082
September.....	90.0	31.5	52.7	0.032	0.036	3,136
October.....	56.5	20.0	48.7	0.030	0.035	2,994
The period.....						39,274

MILK RIVER AT PENDANT D'OREILLE POLICE DETACHMENT

This station was established by F. H. Peters on August 5th, 1909. It is located 300 feet upstream from the buildings of the Police Post in Sec. 19, Tp. 2, Rge. 8, W. 4th, Mer., and is about 61 miles by trail from Milk River Station.

Discharge measurements are made by means of a cable, car, tagged wire, and stay wire. The initial point for soundings is the face of a cedar post on the left bank of the river.

The gauge which is a plain staff graduated to feet and hundredths, is at the left bank of the river and about 80 feet below the cable. It is referred to the top of the post at the initial point; elevation 17.35 above the datum of the gauge.

The river flows in one channel which at ordinary stages is about 130 feet wide, It is straight for about 400 feet above and 300 feet below the station. The right bank is low covered with small willows, and liable to overflow at high stages. The left bank is high, almost clear and not liable to overflow. The bed of the stream is composed of sand and is constantly changing.

The gauge is read by Corporal T. B. Caulkin of the R. N. W. M. P.

DISCHARGE MEASUREMENTS of Milk River at Pendant d'Oreille Police Detachment, in 1910.

DATE	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Dis-charge.
		<i>Feet.</i>	<i>Sq.-ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
April 12.....	F. H. Peters.....	101.3	115.5	1.88	2.76	217
April 22.....	N. M. Sutherland.....	102.1	107.5	1.78	2.545	191
April 28.....	".....	101.4	101.6	1.72	2.57	175
May 5.....	".....	107.9	91.4	1.79	2.705	164
May 12.....	F. H. Peters.....	122.2	103.1	1.57	2.69	162
May 16.....	N. M. Sutherland.....	131.1	130.8	1.65	2.83	216
May 23.....	".....	148.0	148.8	1.72	3.18	255
May 26.....	".....	152.6	128.1	1.53	2.97	196
June 3.....	".....	152.2	97.8	1.02	2.815	99.6
June 8.....	F. H. Peters.....				2.73	110 *
June 16.....	N. M. Sutherland.....				2.82	96.1*
June 24.....	".....				2.58	70.7*
June 28.....	".....				2.48	48.4*
July 5.....	".....				2.52	57.4*
July 11.....	F. H. Peters.....				2.39	34.6*
July 14.....	N. M. Sutherland.....				2.29	25.0*
July 18.....	F. H. Peters.....				2.21	18.3*
July 23.....	N. M. Sutherland.....				2.17	14.3*
August 4.....	".....				1.99	5.84*
August 11.....	".....				2.00	7.07*
August 15.....	".....				2.09	10.5*
August 24.....	L. J. Gleeson.....				2.06	9.11*
August 26.....	".....				2.06	8.86*
September 16.....	G. H. Whyte.....				2.50	65.3*
September 20.....	".....				2.415	48.2*
September 30.....	".....				2.47	52.2*
October 4.....	".....				2.47	60.5*
October 11.....	".....				2.38	40.9*
October 14.....	".....				2.41	41.2*
October 24.....	".....				2.42	46.1*
October 28.....	".....				2.335	28.4*
November 8.....	".....	149.0	63.4	0.73	2.43	46.1*
November 13.....	".....				2.60	39.5*

* Measurements taken at wading sections.

DAILY GAUGE HEIGHT AND DISCHARGE of Milk River at Pendant d'Oreille Police Detachment, for 1910.

Day.	April.		May.		June.		July.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	2.53	132.5	2.78	226.5	2.76*	89.5	2.47	48.0
2.....	2.53*	132.5	2.76	210.0	2.74	78.5	2.49	51.5
3.....	2.52*	129.5	2.70	180.0	2.79	92.0	2.51	55.0
4.....	2.52	129.5	2.75	191.0	2.74	89.0	2.51	55.0
5.....	2.53	132.5	2.76	185.5	2.69	77.0	2.51	55.0
6.....	2.54	136.0	2.71	166.0	2.68	80.5	2.49	51.5
7.....	2.54	136.0	2.68	154.5	2.72	98.0	2.51	55.5
8.....	2.54	136.0	2.65	146.0	2.75	116.5	2.52	56.5
9.....	2.53	132.5	2.63	138.5	2.70	97.0	2.40	37.5
10.....	2.55	139.5	2.64	142.0	2.66	82.5	2.42	39.5
11.....	2.62	162.5	2.75	186.0	2.76	107.0	2.39	34.5
12.....	2.76*	217.0	2.75	186.0	3.18	251.5	2.39	31.5
13.....	2.79*	232.5	2.76	190.0	3.04	195.5	2.37	32.5
14.....	2.82	250.0	2.78*	197.5	2.93	146.5	2.30	25.5
15.....	2.85	282.5	2.81*	209.0	2.83	104.5	2.29	24.5
16.....	2.91	295.0	2.83	216.5	2.81	93.0	2.29	24.5
17.....	2.87	287.0	2.79	189.0	2.79	93.0	2.29	24.5
18.....	2.75	244.5	2.77	172.0	2.69	72.0	2.23	19.5
19.....	2.59	291.0	2.89	197.5	2.64	65.5	2.21*	18.0
20.....	2.55	181.5	2.96	209.0	2.61	62.5	2.20	17.5
21.....	2.54	183.5	3.10	248.0	2.59	62.0	2.21	18.0
22.....	2.58	203.5	3.11	235.0	2.60	67.5	2.20	17.5
23.....	2.61	201.5	3.18	255.5	2.61	73.5	2.17	15.5
24.....	2.72	248.0	3.14	246.5	2.59	74.0	2.19	16.5
25.....	2.66	221.0	3.04	216.5	2.57	69.0	2.14	13.5
26.....	2.62	201.5	2.95	189.5	2.53*	60.5	2.08	10.0
27.....	2.59	186.5	2.89	161.0	2.49	52.0	2.09	10.5
28.....	2.54	163.5	2.91	163.5	2.47	47.5	2.04	8.3
29.....	2.60	176.5	2.82	134.5	2.47	47.5	2.05	8.7
30.....	2.70	205.0	2.82	119.5	2.47	47.5	2.06	9.2
31.....			2.79*	104.0			2.03	8.0

* Observations have been interpolated.

DAILY GAUGE HEIGHT AND DISCHARGE of Milk River at Pendant d'Oreille Police Detachment, for 1910.—Continued.

Day.	August.		September.		October.		November.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.
1.....	2.02	7.5	2.15	21.5	2.48	56.5	2.42*	39.5
2.....	2.00	6.7	2.13	21.0	2.51	64.5	2.45*	45.5
3.....	2.00*	6.7	2.12	21.0	2.49	62.5	2.47	49.0
4.....	1.99*	6.4	2.29	38.0	2.47	60.5	2.44	45.5
5.....	2.01	7.1	2.39	52.5	2.47	60.5	2.37	37.0
6.....	2.12	12.0	2.39	52.5	2.45	56.5	2.48	52.5
7.....	2.19	16.5	2.50	74.0	2.46	57.5	2.32	31.5
8.....	2.16	14.5	2.49	71.0	2.42	50.0	2.45	49.0
9.....	2.11	11.5	2.49	70.0	2.42	49.0	2.40	.....
10.....	2.07	9.7	2.55	83.5	2.40	45.0	2.48	.....
11.....	2.07	9.7	2.55	82.0	2.38	41.0	2.58	.....
12.....	2.04	8.3	2.54	77.5	2.37	39.0	2.72	.....
13.....	2.05	8.8	2.57	83.5	2.38	39.0	2.62	.....
14.....	2.08	10.0	2.53	73.5	2.40	40.0	2.57	.....
15.....	2.10	11.0	2.51	68.0	2.40	40.0	2.56	.....
16.....	2.12	12.0	2.53	71.5	2.39	39.0	2.56	.....
17.....	2.09	10.5	2.53	71.5	2.42	43.5	2.54	.....
18.....	2.10	11.0	2.52	69.0	2.43	45.0	2.44	.....
19.....	2.08	10.0	2.47	58.0	2.43	45.0	2.54	.....
20.....	2.07	9.7	2.42	48.0	2.44	48.0	2.53	.....
21.....	2.08	10.0	2.40	46.0	2.42	45.0	2.62	.....
22.....	2.10	11.0	2.36	40.0	2.42	45.0	2.83	.....
23.....	2.05	8.7	2.36	39.5	2.44	49.0	2.71	.....
24.....	2.09	10.5	2.38	41.5	2.42	46.0	2.45	.....
25.....	2.06	9.2	2.40	44.5	2.43	46.0	2.36	.....
26.....	2.06	9.2	2.41*	45.5	2.51	51.0	2.33	.....
27.....	2.06	10.5	2.42*	46.0	2.61	70.0	2.39	.....
28.....	2.04	11.0	2.43	47.0	2.33	27.5	2.50	.....
29.....	2.03	11.5	2.46	52.0	2.42	33.0	2.43	.....
30.....	2.10	17.5	2.48	54.5	2.24	21.0	.....	.....
31.....	2.19	25.5	.....	.....	2.39	36.0	.....	.....

* Observations have been interpolated.

MONTHLY DISCHARGE of Milk River at Pendant d'Oreille Police Detachment, for 1910.
(Drainage area, 2175 square miles.)

Month.	Discharge in Second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on Drainage area.	Total in acre-feet.
April.....	295.0	129.5	189.3	0.087	0.097	11,264
May.....	255.5	104.0	186.0	0.086	0.098	11,437
June.....	251.5	47.5	89.8	0.041	0.046	5,343
July.....	56.5	8.0	28.9	0.013	0.015	1,777
August.....	25.5	6.4	10.8	0.005	0.006	664
September.....	83.5	21.0	22.1	0.010	0.011	1,315
October.....	64.5	21.0	46.8	0.022	0.025	2,878
The period.....	.....	.....	.....	.....	.....	34,678

MILK RIVER AT SPENCER'S LOWER RANCHE.

This station was established on August 7th, 1909, by F. H. Peters. It is located in Sec. 1, Tp. 1, Rge. 5, W. 4th Mer., about 1,000 feet upstream from the International Boundary. It is 90 miles by trail from Milk River station, 26 miles from Pendant d'Oreille and 19 miles from Wild Horse Police Detachment.

The river flows in one channel at all stages. It is straight for about 300 feet above and 500 feet below the station. The right bank is low, wooded and liable to overflow during high flood stages. The left bank is steep, heavily wooded and liable to overflow during extreme flood stage. The bed is composed of sand which is constantly shifting.

Discharge measurements are made by means of a cable, car, tagged wire, and stay wire. The initial point for soundings is the inner face of a round post on the left bank. Discharge measurements can be made by wading during low water.

The gauge, which is a plain staff, graduated to feet and hundredths, is fixed to a post at the right bank. It is referred to the top of a poplar stump on the right bank; elevation, 14.25 feet above the datum of the gauge. It was read during 1910 by Chas. Latimer.

DISCHARGE MEASUREMENTS of Milk River at Spencer's Lower Rancho, in 1910.

Date.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Dis-charge.
		<i>Feet.</i>	<i>Sq. ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
April 14.....	F. H. Peters.....	82.2	117	2.03	2.62	238
April 22.....	N. M. Sutherland.....	79.2	104.7	1.94	2.49	204
April 27.....	".....	79.2	98.9	1.80	2.43	178
May 6.....	".....	79.4	92.1	1.73	2.405	159
May 13.....	".....	79.8	97.3	1.59	2.37	155
May 24.....	".....	82.2	124.2	2.03	2.72	252
June 4.....	".....	73.0	72.8	1.56	2.26	113
June 14.....	".....	84.1	110.8	1.82	2.55	201
June 27.....	".....	78.2	52.3	1.15	1.975	60.3
July 6.....	".....				1.86	44.4*
July 11.....	F. H. Peters.....	75.0	33.3	1.07	1.74	35.7
July 14.....	N. M. Sutherland.....				1.68	26.6*
July 24.....	".....	46.9	12.0	0.80	1.44	9.57*
August 1.....	".....	34.1	8.45	0.66	1.315	5.57*
August 13.....	".....				1.24	2.71*
August 14.....	".....	31.6	5.94	0.64	1.28	3.77*
August 25.....	L. J. Gleeson.....				1.26	4.03*
September 19.....	G. H. Whyte.....				1.91	54.6*
October 2.....	".....				1.90	46.8*
October 13.....	".....				1.84	36.2*
October 26.....	".....				1.86	40.5*
November 11.....	".....				1.71	24.8*

* Measurements made at wading stations.

DAILY GAUGE HEIGHT AND DISCHARGE of Milk River at Spencer's Lower Rancho, for 1910

Day.	April.		May.		June.		July.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....			2.49	196.0	2.38	149.5	1.94	55.0
2.....			2.50	198.0	2.43	175.0	1.94	55.5
3.....			2.52	203.0	2.33	134.5	1.93	54.0
4.....			2.48	188.5	2.28	119.0	1.91	51.0
5.....			2.44	173.5	2.25	111.0	1.94	55.0
6.....			2.43	168.5	2.20	99.5	1.88	47.0
7.....			2.38	154.0	2.17	92.5	1.87	47.0
8.....			2.32	135.5	2.18	95.0	1.83	43.5
9.....			2.28	125.0	2.23	107.0	1.79	40.0
10.....			2.26	120.0	2.20	100.0	1.76	37.5
11.....			2.30	132.0	2.17	92.5	1.78	40.5
12.....			2.33	142.0	2.21	101.0	1.77	38.0
13.....			2.32	139.5	2.57	209.5	1.65	25.0
14.....	2.62	237.6	2.36	152.0	2.54	197.5	1.68	26.5
15.....	2.70	266.5	2.47	184.0	2.42	163.5	1.65	24.5
16.....	2.67	257.5	2.50	191.5	2.31	133.0	1.65	25.0
17.....	2.69	266.5	2.54	204.0	2.23	119.5	1.59	20.5
18.....	2.70	271.5	2.45	172.5	2.17	110.5	1.56	18.5
19.....	2.61	242.0	2.46	175.5	2.14	106.0	1.53	16.0
20.....	2.52	212.0	2.53	202.5	2.19	115.0	1.51	15.0
21.....	2.47	196.0	2.56	204.5	2.05	90.0	1.48	13.0
22.....	2.46	193.0	2.77	274.5	2.05	88.5	1.48	12.5
23.....	2.49	202.5	2.70	249.0	2.06	88.5	1.49	12.5
24.....	2.52	217.5	2.75	264.0	2.06	85.5	1.45	10.0
25.....	2.55	222.5	2.79	279.5	2.05	80.0	1.44	10.0
26.....	2.52	211.5	2.69	246.5	2.03	73.0	1.43	9.7
27.....	2.43	178.0	2.58	210.5	1.97	59.5	1.39	8.0
28.....	2.42	169.0	2.50	183.5	1.93	54.0	1.34	7.5
29.....	2.45	183.5	2.45	168.5	1.85	43.5	1.33	7.0
30.....	2.47	189.5	2.41	163.0	1.89	47.5	1.32	5.5
31.....			2.32	130.5			1.32	5.7

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DAILY GAUGE HEIGHT AND DISCHARGE of Milk River at Spencer's Lower Ranche, for 1910.—*Con.*

Day.	August.		September.		October.		November.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	1.32	5.5	1.36	12.3	1.88	45.0	1.83	37.5
2.....	1.31	5.1	1.42	16.0	1.91	48.0	1.88	44.0
3.....	1.31	5.1	1.44	17.5	1.94	52.0	1.91	47.0
4.....	1.29	4.4	1.51	18.0	1.92	49.0	1.95	52.5
5.....	1.26	3.2	1.71	42.0	1.94	51.5	1.90	46.0
6.....	1.26	3.2	1.60	30.0	1.92	48.5	1.87	41.5
7.....	1.27	3.7	1.64	33.5	1.93	49.0	2.03	68.5
8.....	1.26	3.2	1.69	38.5	1.88	43.0	1.87	42.0
9.....	1.27	3.7	1.74	43.5	1.87	39.0	2.03	68.5
10.....	1.28	4.0	1.77	46.5	1.87	41.0	1.93	48.5
11.....	1.27	3.7	1.79	48.0	1.85	38.5	1.87	41.5
12.....	1.26	3.2	1.84	54.5	1.84	37.0	1.82	.....
13.....	1.25	3.0	1.91	64.5	1.84	36.0	1.75	.....
14.....	1.28	3.7	1.94	68.0	1.85	38.0	1.95	.....
15.....	1.30	3.9	1.93	65.5	1.85	38.0	1.94	.....
16.....	1.32	4.0	1.94	65.5	1.83	36.0	2.11	.....
17.....	1.32	4.0	1.92	60.5	1.84	37.5	2.12	.....
18.....	1.30	3.9	1.90	55.5	1.84	37.5	1.92	.....
19.....	1.28	3.8	1.91	54.5	1.87	40.5	1.96	.....
20.....	1.26	3.7	1.91	53.5	1.89	43.0	1.96	.....
21.....	1.26	3.7	1.90	52.5	1.95	51.0	1.99	.....
22.....	1.26	3.7	1.83	42.5	1.88	42.5	1.92	.....
23.....	1.25	3.7	1.86	45.5	1.87	42.5	2.00	.....
24.....	1.26	3.7	1.83	41.0	1.87	42.5	2.33	.....
25.....	1.27	3.5	1.84	42.0	1.87	42.5	2.88	.....
26.....	1.26	4.5	1.86	44.5	1.87	42.5	2.25	.....
27.....	1.28	6.2	1.84	41.0	1.82	36.0	2.50	.....
28.....	1.28	6.8	1.82	38.5	1.85	39.5	2.37	.....
29.....	1.29	7.9	1.82	38.5	1.83	37.0	2.33	.....
30.....	1.31	9.5	1.85	41.5	1.86	40.5	2.35	.....
31.....	1.34	11.0	.....	.....	1.89	44.5	.....	.....

MONTHLY DISCHARGE of Milk River at Spencer's Lower Ranche, for 1910.

Drainage area, 2,448 square miles.

Month.	Discharge in Second-Feet.				Run-Off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on Drainage area.	Total in acre-feet.
April (14-30).....	271.5	169.0	218.6	0.089	0.056	7,372
May.....	279.5	120.0	184.9	0.076	0.088	11,369
June.....	209.5	43.5	108.0	0.044	0.049	6,426
July.....	55.5	5.5	27.0	0.011	0.013	1,660
August.....	11.0	3.0	4.6	0.002	0.002	282
September.....	68.0	12.3	43.8	0.018	0.020	2,606
October.....	52.0	36.0	42.2	0.017	0.020	2,595
The period.....	.....	.....	.....	.....	.....	32,310

STUDY OF CONDITIONS OF RUN-OFF WATERSHED of the Milk River from its head waters to its eastern crossing from Canada in Sec. 3, Tp. 1, Rge. 5, W. 4th Mer.
For the period from August 1st to October 31, 1910.

STATION.	AREA OF WATERSHED—Square Miles.						Run-off—Ac. ft.		Run-off per sq. mile ac. ft.	
	Additional to last station.			Total for station.			Additional to last station.	Total for station.	For additional area.	For total area.
	Canada.	U.S.A.	Total	Canada.	U.S.A.	Total				
Peters Ranche, 13-1-23-4.....				18	91	109	.....	4,143	.....	38.00
Knights Ranche, 13-2-21-4.....	124	6	130	142	97	239	0017	4,160	0.13	17.40
Mackies' Ranche, N.B., 19-2-18-4.....	196	0	196	338	97	435	0710	4,870	3.62	11.19
Junction, N. & S. Branch, 23-2-18-4.....	68	390	458	406	487	893	+ 3943	8,813	8.60	9.87
Milk River, 28-2-16-4.....	182	2	184	588	489	1,077	— 0935	7,878	0.00	7.31
Writing-on-Stone, 35-1-13-4.....	414	129	543	1,002	618	1,620	— 0666	7,212	0.00	4.45
Pendant d'Oreille, 16-2-8-4.....	397	158	555	1,399	776	2,175	— 2355	4,857	0.00	2.23
Spencer's Lower, 3-1-5-4.....	246	27	273	1,645	803	2,448	+ 626	5,483	2.29	2.19

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MISCELLANEOUS DISCHARGE MEASUREMENTS in Milk River Drainage Basin in 1910.

DATE.	Stream.	Locality.	Hydrographer.	Width.	Area of Section.	Discharge.
				Feet.	Sq.-ft.	Sec.-ft.
April 11.....	Beargulch Creek..	Sec. 30-2-9-4.....	F. H. Peters.....			0.6
April 21.....	"	"	N. M. Sutherland..			0.2
April 29.....	"	"	"			0.25
May 17.....	"	"	"			0.15
May 22.....	"	"	"			0.0
April 10.....	Creek.....	Sec. 34-1-13-4.....	F. H. Peters.....			0.3
April 27.....	"	S.E. 27-1-21-4.....	L. J. Gleeson.....	10	10	3.0
May 11.....	"	"	"	4	2	1.44
May 19.....	"	"	"	3	1.5	3.0
May 25.....	"	"	"	3	1.5	2.55
June 8.....	"	"	"	10	5	5.0
April 13.....	"	S.E. 24-1-23-4.....	"	4	1	0.66
April 13.....	"	S.E. 27-1-21-4.....	"	12	12	6.0
April 14.....	"	S.W. 19-2-20-4.....	"	15	7.5	11.25
April 14.....	"	S.W. 19-2-18-4.....	"	5	10	5.0
April 21.....	"	S.W. 19-2-20-4.....	"	15	7.5	5.4
May 12.....	"	"	"	5	5	1.65
April 21.....	"	S.E. 24-1-23-4.....	"	3	0.5	0.25
May 11.....	"	"	"	4	1.2	0.6
May 20.....	"	"	"	3	1.2	1.2
May 24.....	"	"	"	3	1.2	1.2
June 3.....	"	"	"	3	1.2	1.2
June 8.....	"	"	"	5	2.5	3.0
June 21.....	"	"	"			0.75
April 19.....	"	S.W. 19-2-18-4.....	"	5	5	2.0
April 11.....	Deer Creek.....	Sec. 36-1-12-4.....	F. H. Peters.....			0.0
April 11.....	Deadhorse Creek..	N.W. 4-1-11-4.....	"			0.33
April 21.....	"	"	N. M. Sutherland..			0.10
April 29.....	"	"	"			0.12
May 17.....	"	"	"			0.10
May 22.....	"	"	"			0.12
May 27.....	"	"	"			0.10
June 1.....	"	"	"			0.10
June 17.....	"	"	"			0.05
June 23.....	"	"	"			0.08
September 16...	"	"	G. H. Whyte.....			0.02
September 29...	"	"	"			0.02
October 5.....	"	"	"			0.04
October 11.....	"	"	"			0.03
October 15.....	"	"	"			0.04
October 24.....	"	"	"			0.02
October 29.....	"	"	"			0.03
November 7.....	"	"	"			0.05
November 14...	"	"	"			0.10
April 11.....	Halfbreed Creek..	Sec. 28-2-10-4.....	F. H. Peters.....			0.4
April 21.....	"	"	N. M. Sutherland..			0.25
April 29.....	"	"	"			0.15
May 12.....	"	"	F. H. Peters.....			0.08
May 17.....	"	"	N. M. Sutherland..			0.0
May 22.....	"	"	"			0.0
April 14.....	Kennedy Creek....	Sec. 2-1-5-4.....	F. H. Peters.....			Nil.
April 22.....	"	"	N. M. Sutherland..			Nil.
April 23.....	Lost River.....	Sec. 2-1-4-4.....	"			0.0
May 13.....	"	"	"			0.08
May 14.....	"	"	F. H. Peters.....			Nil.
April 14.....	Lonely Valley River	Sec. 28-2-20-4.....	L. J. Gleeson.....	5	10	5.0
April 21.....	"	"	"	5	5	2.0
April 28.....	"	"	"	6	4.2	2.1
May 17.....	"	"	"	5	5	2.0
May 26.....	"	"	"	5	5	2.0
June 8.....	"	"	"	5	0.5	0.34
June 22.....	"	"	"			1.0
October 1.....	"	"	N. M. Sutherland..			0.1
April 21.....	Miners Coulee....	Sec. 10-2-11-4.....	"			Nil.
April 20.....	Police Creek.....	Sec. 34-1-13-4.....	"			Nil.
May 18.....	"	"	"			0.1
May 4.....	Red Creek.....	Sec. 18-1-15-4.....	F. H. Peters.....			Nil.
May 8.....	"	"	"			Nil.

PAKOWKI LAKE DRAINAGE BASIN.

General Description.

The drainage into Pakowki Lake comes from three different directions, from the west by way of Etzikom Coulee, from the southeast in Canal Creek and from the northeast in Manyberries Creek. The lake has no outlet. The streams making up the drainage basin are very similar in their general characteristics, all having narrow, deep and well defined valleys, with sparse growths of brush along the bottoms, and all draining a sandy and very unproductive appearing soil. The drainage consists almost entirely of the spring run-off, the soil being so devoid of moisture as to take care of any ordinary rainfalls without allowing for any drainage into the streams.

Very little information has been collected as yet regarding the flow in any of the above mentioned streams, the only one touched upon, as yet being the Manyberries Creek.

MANYBERRIES CREEK AT HOOPER AND HUCKVALE'S RANCHE.

This station was established June 17th, 1910, by H. R. Carscallen. It is located on Sec. 3, Tp. 5, Rge. 6, W. 4th Mer., at Hooper and Huckvale's ranche, below the junction of the creek with its south branch and about seven miles east of Pakowki Lake.

The creek flows in one channel. It is straight for 400 feet above and 500 feet below the station. Both banks are high and do not overflow. They are composed of a sandy loam and are sparsely covered with brush. The bed of the stream is composed of sand and gravel.

The gauge, which is a plain staff, graduated to feet and hundredths, is spiked vertically to a post sunk in the bed of the creek at the right bank and stayed. It is referred to bench marks as follows:—(1) A spikehead in hub beside the final point stake on the right bank; elevation, 20.52. (2) A spike-head in a willow stump at chainage 75 feet on left bank; elevation, 8.65.

Discharge measurements are made with current meter by wading. The initial point for soundings is a stake driven close to the ground on the left bank and marked I.P.o.o. At extreme low water stage a weir is used.

The spring run-off for 1910 had passed before this station was established, and the creek was dry at that time. A heavy rain in July started a flow and gauge height observations were made by Mr. Sidney Hooper covering the period of flow, July 4 to 7. The readings were 2.9, 2.1, 1.5 and 0.9, but as the district hydrographer was not in this locality at the time, the daily discharges have not been computed.

SAGE CREEK DRAINAGE BASIN.

General Description.

Sage is a small but important tributary of Milk River, which rises in the hills or "bad-lands." A few miles north of the International Boundary it widens out and forms Wild Horse Lake and finally empties into Milk River on the south side of the Boundary.

There is only a small rain-fall in this basin and the greatest run-off is in the early spring when the melting snow is going out. Being bare of all tree growth, the water runs off very rapidly and has cut deep coulees and ravines in the basin.

SAGE CREEK AT WILD HORSE POLICE DETACHMENT.

This station was established on August 10, 1909, by F. H. Peters. It is located in Sec. 9, Tp. 1, Rge. 2, W. 4th Mer., about $1\frac{1}{4}$ miles from Wild Horse Police Post. It is about 115 miles by trail from Milk River station.

The channel is straight for 40 feet above and below the station. The banks are composed of hard clay, are high, but liable to overflow at flood stage of the stream. The bed is composed of hard gumbo clay.

Discharge measurements are made by wading. The initial point for soundings is the face of a post on the right bank marked o oo in red paint.

The gauge which is a plain staff, graduated to feet and hundredths, is fixed to a post in the centre of the channel. It is referred to the top of the post at the initial point for soundings.

In 1910, Sage Creek ran from March 17 to April 15, and the gauge was read during that time by Corp. Tom Brewer, but as the district hydrographer was not in the locality at the time, estimates of the discharge have not been made.

LODGE CREEK DRAINAGE BASIN.

General Description.

Lodge Creek rises in Tp. 7, Rge. 3, W. 4th Mer., flows in a southerly direction for about 12 miles, then turns south-eastward, crosses the International Boundary in Sec. 4, Tp. 1, Rge. 28, W. 3rd Mer., and eventually empties into Milk River near Chinook, Montana. Its principal tributary is Middle Creek which joins it in Sec. 4, Tp. 2, Rge. 29, W. 3rd Mer.

Near its head the valley is very deep and narrow, but it broadens out considerably lower down, giving rise to large flats and meadows. The upper part of the drainage basin is cut up to a great extent by deep coulees which drain into the creek. This part of the creek is thickly covered with brush along the banks, but lower down is totally devoid of tree growth. The valley is rather unproductive owing to the absence of moisture but a few good hay meadows have been developed along its course through the storage of the creek waters and their application to the soil by irrigation. As is the case with many of the streams in this locality the flow in Lodge Creek is not continuous throughout the season, the creek being dry, with the exception of pools of standing water, during the greater part of the summer months. At flood stages the creek carries a very considerable amount of water and as a result its channel is wide and well defined throughout the whole length of its course.

Two stations have been established on this creek one at Willow Creek Police Detachment near the International Boundary, and the other near the head of the creek at Hart's ranche. Descriptions of these stations are given below.



Measuring the Velocity with a Current Meter by Wading.



Hydrographer's Flying Camp.

LODGE CREEK AT WILLOW CREEK POLICE DETACHMENT.

This station was established by F. H. Peters, on August 13, 1909. It is located on the S.E. $\frac{1}{4}$ Sec. 12, Tp. 1, Rge. 29, W. 3rd Mer., and about 500 feet east of the house at Willow Creek Detachment. It is about 140 miles by trail from Milk River station and about 75 miles by trail from Maple Creek.

The stream flows in one channel, which is straight for about 200 feet above and 150 feet below the station. The right bank is steep, composed of solid clay and not liable to overflow. The left bank gradually rises, is composed of solid clay and stones, and not liable to overflow.

The gauge, which is a plain staff, graduated to feet and hundredths is fixed to a post at the left bank. It is referred to the top of a post on the right bank; elevation, 11.55 feet above the datum of the gauge.

During ordinary stages of flow, discharge measurements are made by wading at the gauge. The initial point for soundings is the face of the B. M. post. During 1910 the flow became so small that on May 16th a 24" sharp crested rectangular weir was established about 6 ft. above the gauge. An auxiliary gauge was also established for the weir on the same date.

The gauge was read during 1910, by Constable C. H. Cuthbertson.

DISCHARGE MEASUREMENTS of Lodge Creek at Willow Creek Police Detachment, in 1910.

DATE.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Discharge.
		<i>Feet.</i>	<i>Sq.-ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
April 25.....	N. M. Sutherland.....	20.05	9.72	0.708	0.94	6.91
May 9.....	".....	16.6	5.72	0.052	0.685	0.30
May 12.....	".....	16.5	4.45	0.054	0.65	0.24
May 18.....	F. H. Peters.....				9.34	0.15*
June 13.....	H. R. Carscallen.....					Nil.

* Discharge determined by using a 24 inch weir.

DAILY GAUGE HEIGHT AND DISCHARGE of Lodge Creek at Willow Creek Police Detachment, for 1910.

DAY.	April.		May.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....			0.88	4.34
2.....			0.86	3.60
3.....			0.87	3.96
4.....			0.83	2.60
5.....			0.81	2.05
6.....			0.75	0.86
7.....			0.73	0.60
8.....			0.70	0.37
9.....			0.68	0.28
10.....			0.67	0.26
11.....			0.66	0.25
12.....			0.65	0.24
13.....			0.63	0.20
14.....			0.62	0.17
15.....				*
16.....				
17.....				
18.....				
19.....				
20.....				
21.....				
22.....				
23.....				
24.....				
25.....		0.94	6.91	
26.....		0.94	6.91	
27.....		0.94	6.91	
28.....		0.93	6.47	
29.....		0.92	6.02	
30.....		0.90	5.15	
31.....				

* Creek dry from June 14 to end of year.

MONTHLY DISCHARGE of Lodge Creek at Willow Creek Police Detachment, for 1910.

Drainage area, 834 square miles.

Month.	Discharge in Second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on Drainage area.	Total in acre-feet.
April (25-30).....	6.91	5.15	6.40	0.008	0.002	76
May (1-14).....	4.34	0.17	1.41	0.002	0.001	39
The period.						115

LODGE CREEK AT HART'S RANCHE.

This station was established July 22, 1909, by F. T. Fletcher. It is located 54 feet south of the road allowance between Sec's 15 and 10, Tp. 6, Rge. 3, W. 4th Mer., about ½ mile below the junction of the east and west branches of Lodge Creek and is about 45 miles south of Medicine Hat.

The channel is straight for about 60 feet above and 250 feet below the station. The banks are high, steep and not liable to overflow. Both banks are covered with a dense growth of willow brush. The bed of the stream is composed of clay and there is one channel at all stages. On account of the narrow channel and the steep banks, the water will be very deep at high stages of the stream and could not be waded.

The gauge is a plain staff, graduated to feet and hundredths, spiked to an upright sunk in the bed of the creek at the left bank and braced. It is referred to two bench marks:—(1) A spike-head in top of a stake driven close to the ground elevation, 13.71; (2) a row of 5" spikes, 6" above the ground in a gate post near J. E. Hart's house, elevation, 14.13.

This station was visited in June and on July 12, 1910, by H. R. Carscallen, and on both occasions the creek was dry, and from evidence obtained on the ground it appears to have been dry during the whole year.

MIDDLE CREEK AT HAMMOND'S RANCHE.

This station was established June 13, 1910, by H. R. Carscallen. It is located on the N.W. ¼ Sec. 4, Tp. 2, Rge. 29, W. 3rd Mer., about 7 miles above the Willow Creek Police Detachment and about ¼ of a mile above the junction of Middle and Lodge Creeks.

The channel is straight for 200 feet above and 125 feet below the station. Both banks are high and fairly steep, free from brush and not liable to overflow. The bed of the stream is sandy and may shift at high stages. The station, being located so close to the junction with Lodge Creek, may be affected by backwater from that creek at high water stages.

Discharge measurements are made at the station by wading and at extreme low stages a weir may be used. High water measurements are not attainable, as there is no structure at the station to support the engineer in taking the gaugings when the water becomes too deep for wading. The initial point for soundings is a stake driven close to the ground on the left bank and marked I. P. O. O.

The gauge is a plain staff, graduated to feet and hundredths, spiked to a post set vertically in the bed of the creek at the left bank and stayed. It is referred to two bench marks:—(1) Two spikes in a log at northwest corner of D. A. Hammond's house, elevation 15.20 above datum; (2) a spike-head in a hub driven close to the ground beside the final point stake on the right bank, elevation, 10.52 above datum.

At the time the station was established and during the balance of the year there was water in pools at this point, but there was no surface flow.

MIDDLE CREEK, AT ROSS' RANCHE.

This station was established July 20, 1908, by H. R. Carscallen. It is located on Sec. 30, Tp. 5, Rge. 29, W. 3rd Mer., about four miles from Battle Creek P.O.

The channel is straight for 50 feet above and below the station. The right bank is high, but the left is low and liable to overflow in flood stages of the stream. The bed of the stream is composed of sand and coarse gravel with a little vegetation at the section, and probably shifts slightly during high water. There is only one channel at low stages, but in extreme flood stages water breaks out over the left bank and forms two channels. The current is sluggish at low stages and moderate at higher stages.

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Discharge measurements are made by wading at moderate stages and at very low stages a weir is used. The initial point for soundings is a square stake driven close to the ground on the left bank and marked I. P. O. O.

The gauge, which is read once each day by Mr. Ross is a plain staff, graduated to feet and hundredths, nailed to a pine post sunk in the bed of the creek at the left bank and securely stayed. It is referred to bench marks as follows:—(1) The top of the final point driven close to the ground on the right bank and marked B. M. in red paint; elevation, 5.91 feet above the zero of the gauge. (2) The heads of three spikes driven into the top of the ground-log between the stable and the hen-house facing the gauge and marked B. M. in red paint; elevation, 10.63 feet above the zero of the gauge.

DISCHARGE MEASUREMENTS of Middle Creek, at Ross' Rancho, in 1910.

Date.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Dis-charge.
		<i>Feet.</i>	<i>Sq. ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
April 22.....	H. R. Cascallen.....	9.2	5.10	0.163	0.73	0.83*
May 16.....	".....	8.7	4.35	0.111	0.66	0.48*
June 10.....	".....	8.8	4.34	0.092	0.65	0.40*
July 2.....	".....	9.0	4.63	0.059	0.66	0.27*
July 25.....	".....	8.7	4.16	0.071	0.66	0.296*
August 12.....	".....	9.0	3.87	0.070	0.64	0.27*
September 3.....	".....	8.9	4.29	0.077	0.66	0.33*
September 29.....	R. G. Swan.....	8.8	4.32	0.091	0.68	0.39
October 25.....	".....	4.0	4.00	0.090	0.64	0.36

* Discharge determined by using a 15 inch weir.

DAILY GAUGE HEIGHT AND DISCHARGE of Middle Creek, at Ross' Rancho, for 1910.

Day.	April.		May.		June.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....			0.70	0.54	0.65	0.35
2.....			0.70	0.54	0.65	0.35
3.....			0.70	0.54	0.65	0.35
4.....			0.70	0.54	0.65	p.35
5.....	0.70	0.54	0.70	0.54	0.65	0.35
6.....	0.70	0.54	0.70	0.54	0.65	0.35
7.....	0.70	0.54	0.70	0.54	0.65	0.35
8.....	0.80	1.00	0.70	0.54	0.65	0.35
9.....	0.80	1.00	0.70	0.54	0.65	0.35
10.....	0.80	1.00	0.70	0.54	0.65	0.35
11.....	0.80	1.00	0.70	0.54	0.65	0.35
12.....	0.80	1.00	0.70	0.54	0.65	0.35
13.....	0.80	1.00	0.70	0.54	0.65	0.35
14.....	0.80	1.00	0.70	0.54	0.65	0.35
15.....	0.70	0.54	0.70	0.54	0.65	0.35
16.....	0.70	0.54	0.65	0.35	0.65	0.35
17.....	0.70	0.54	0.65	0.35	0.80	1.00
18.....	0.70	0.54	0.65	0.35	0.70	0.54
19.....	1.30	3.58	0.70	0.54	0.65	0.35
20.....	1.20	3.06	0.70	0.54	0.65	0.35
21.....	1.00	2.02	0.70	0.54	0.65	0.35
22.....	0.80	1.00	0.65	0.35	0.65	0.35
23.....	0.70	0.54	0.65	0.35	0.65	0.35
24.....	0.70	0.54	0.65	0.35	0.65	0.35
25.....	0.70	0.54	0.65	0.35	0.65	0.35
26.....	0.70	0.54	0.65	0.35	0.65	0.35
27.....	0.70	0.54	0.65	0.35	0.65	0.35
28.....	0.70	0.54	0.65	0.35	0.65	0.35
29.....	0.70	0.54	0.65	0.35	0.65	0.35
30.....	0.70	0.54	0.65	0.35	0.75	0.76
31.....			0.65	0.35		

DAILY GAUGE HEIGHT AND DISCHARGE of Middle Creek, at Ross' Ranche, for 1910.—Continued

Day.	July.		August.		September.		October.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.
1.....	0.75	0.76	0.64	0.32	0.68	0.46	0.67	0.43
2.....	0.70	0.54	0.63	0.29	0.66	0.39	0.67	0.43
3.....	0.70	0.54	0.63	0.29	0.66	0.39	0.67	0.43
4.....	0.70	0.54	0.63	0.29	0.66	0.39	0.67	0.43
5.....	0.70	0.54	0.65	0.35	0.68	0.46	0.67	0.43
6.....	0.70	0.54	0.66	0.39	0.69	0.50	0.67	0.43
7.....	0.70	0.54	0.69	0.50	0.69	0.50	0.67	0.43
8.....	0.70	0.54	0.67	0.43	0.69	0.50	0.67	0.43
9.....	0.70	0.54	0.66	0.39	0.68	0.46	0.67	0.43
10.....	0.70	0.54	0.66	0.39	0.67	0.43	0.67	0.43
11.....	0.70	0.54	0.65	0.35	0.67	0.43	0.67	0.43
12.....	0.70	0.54	0.65	0.35	0.67	0.43	0.67	0.43
13.....	0.70	0.54	0.67	0.43	0.66	0.39	0.67	0.43
14.....	0.70	0.54	0.67	0.43	0.66	0.39	0.67	0.43
15.....	0.70	0.54	0.70	0.54	0.66	0.39	0.67	0.43
16.....	0.70	0.54	0.70	0.54	0.66	0.39	0.67	0.43
17.....	0.70	0.54	0.70	0.54	0.66	0.39	0.67	0.43
18.....	0.70	0.54	0.69	0.50	0.66	0.39	0.67	0.43
19.....	0.70	0.54	0.68	0.46	0.67	0.43	0.67	0.43
20.....	0.70	0.54	0.68	0.46	0.67	0.43	0.67	0.43
21.....	0.70	0.54	0.68	0.46	0.67	0.43	0.67	0.43
22.....	0.70	0.54	0.68	0.46	0.67	0.43	0.67	0.43
23.....	0.70	0.54	0.68	0.46	0.67	0.43	0.67	0.43
24.....	0.70	0.54	0.68	0.46	0.67	0.43	0.67	0.43
25.....	0.65	0.35	0.68	0.46	0.67	0.43	0.67	0.43
26.....	0.65	0.35	0.67	0.43	0.67	0.43	0.67	0.43
27.....	0.65	0.35	0.67	0.43	0.67	0.43	0.66	0.39
28.....	0.70	0.54	0.68	0.46	0.67	0.43	0.65	0.35
29.....	0.67	0.43	0.68	0.46	0.67	0.43	0.64	0.32
30.....	0.66	0.39	0.68	0.46	0.67	0.43	0.64	0.32
31.....	0.66	0.39	0.68	0.46	.....	.....	0.64	0.32

MONTHLY DISCHARGE of Middle Creek, at Ross' Ranche, for 1910.

Drainage area, 168 square miles.

Month.	Discharge in Second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on Drainage area.	Total in acre-feet.
April (5-30).....	3.58	0.54	0.952	0.006	0.004	49
May.....	0.54	0.35	0.460	0.003	0.003	28
June.....	1.00	0.35	0.392	0.002	0.002	23
July.....	0.76	0.35	0.515	0.003	0.003	32
August.....	0.54	0.29	0.427	0.003	0.003	26
September.....	0.50	0.39	0.428	0.003	0.003	25
October.....	0.43	0.32	0.415	0.002	0.002	25
The period.....	.....	.....	.....	.....	.....	208

MIDDLE CREEK AT MCKINNON'S RANCHE.

This station was established June 21, 1910, by H. R. Carscallen. It is located on the S.W. $\frac{1}{4}$ Sec. 35, Tp. 5, Rge. 1, W. 4th Mer., about 11 miles southwest of Battle Creek, P.O.
The channel is slightly curved but is comparatively straight for about 150 feet above and 100 feet below the station. The right bank is high with a gradual slope; the left bank is high and steep. Neither bank is liable to overflow except in extreme flood. The bed of the stream is composed of sand and coarse gravel.

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During ordinary stages, discharge measurements are made with current meter by wading, and at extreme low stages a weir is used.

The gauge is a plain staff, graduated to feet and hundredths, spiked to an upright, braced in the bed of the creek at the left bank. It is referred to bench marks as follows:—(1) A spike-head on hub driven close to the ground beside the initial point stake on the left bank, elevation 7.58; (2) A spike-head in hub driven close to ground beside final point stake on right bank, elevation, 6.29.

The gauge was read once each day by Angus McKinnon, whose house is within 500 yards of the station.

DISCHARGE MEASUREMENTS of Middle Creek at McKinnon's Ranche in 1910.

Date.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Dis-charge.
		<i>Feet.</i>	<i>Sq. ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
June 21.....	H. R. Carscallan.....				0.76	0.47*
July 11.....	".....				0.74	0.32*
July 29.....	".....	10.0	3.79	0.045	0.68	0.17*
August 16.....	".....	10.0	4.23	0.061	0.68	0.26*
September 3.....	".....	10.6	3.87	0.087	0.67	0.34*
September 29.....	R. G. Swan.....	10.2	4.18	0.071	0.64	0.30*
October 25.....	".....				0.66	0.35*

* Discharge determined by using a 15-inch weir.

DAILY GAUGE HEIGHT AND DISCHARGE of Middle Creek, at McKinnon's Ranche, for 1910.

Day.	June.		July.		August.		September.	
	Gauge Height.	Dis-charge	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....			0.85	0.78	0.66	0.22	0.66	0.22
2.....			0.80	0.60	0.66	0.22	0.66	0.22
3.....			0.90	0.99	0.67	0.24	0.66	0.22
4.....			0.90	0.99	0.66	0.22	0.72	0.36
5.....			1.00	1.45	0.67	0.24	0.73	0.39
6.....			0.85	0.78	0.67	0.24	0.72	0.36
7.....			0.75	0.44	0.66	0.22	0.73	0.39
8.....			0.70	0.31	0.66	0.22	0.72	0.36
9.....			0.70	0.31	0.65	0.20	0.71	0.33
10.....			0.75	0.44	0.64	0.18	0.71	0.33
11.....			0.75	0.44	0.65	0.20	0.70	0.31
12.....			0.70	0.31	0.65	0.20	0.70	0.31
13.....			0.75	0.44	0.71	0.34	0.66	0.22
14.....			0.70	0.31	0.70	0.31	0.66	0.22
15.....			0.65	0.20	0.69	0.29	0.66	0.22
16.....			0.65	0.20	0.69	0.29	0.66	0.22
17.....			0.65	0.20	0.67	0.24	0.67	0.24
18.....			0.65	0.20	0.67	0.24	0.66	0.22
19.....			0.65	0.20	0.65	0.20	0.66	0.22
20.....			0.65	0.20	0.65	0.20	0.66	0.22
21.....	0.75	0.44	0.65	0.20	0.65	0.20	0.65	0.20
22.....	0.75	0.44	0.65	0.20	0.65	0.20	0.65	0.20
23.....	0.75	0.44	0.85	0.78	0.66	0.22	0.65	0.20
24.....	0.75	0.44	0.75	0.44	0.66	0.22	0.66	0.22
25.....	0.75	0.44	0.75	0.44	0.67	0.24	0.66	0.22
26.....	0.72	0.36	0.75	0.44	0.67	0.24	0.66	0.22
27.....	0.70	0.31	0.70	0.31	0.67	0.24	0.65	0.20
28.....	0.70	0.31	0.70	0.31	0.66	0.22	0.65	0.20
29.....	0.70	0.31	0.66	0.22	0.66	0.22	0.65	0.20
30.....	0.70	0.31	0.66	0.22	0.66	0.22	0.66	0.22
31.....			0.66	0.22	0.66	0.22		

DAILY GAUGE HEIGHT AND DISCHARGE of Middle Creek, at McKinnon's Rancho, for 1910.—*Con.*

Day.	October.		November.		December.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	0.66	0.22	0.66	0.22	0.63	0.17
2.....	0.66	0.22	0.66	0.22	0.63	0.17
3.....	0.66	0.22	0.66	0.22	0.63	0.17
4.....	0.67	0.24	0.66	0.22	0.63	0.17
5.....	0.67	0.24	0.66	0.22	0.63	0.17
6.....	0.66	0.22	0.65	0.20	0.63	0.17
7.....	0.66	0.22	0.65	0.20	0.63	0.17
8.....	0.66	0.22	0.65	0.20	0.63	0.17
9.....	0.65	0.20	0.65	0.20	0.63	0.17
10.....	0.65	0.20	0.65	0.20	0.63	0.17
11.....	0.65	0.20	0.65	0.20	0.63	0.17
12.....	0.65	0.20	0.66	0.22	0.63	0.17
13.....	0.65	0.20	0.66	0.22	0.63	0.17
14.....	0.65	0.20	0.66	0.22	0.63	0.17
15.....	0.65	0.20	0.66	0.22	0.63	0.17
16.....	0.65	0.20	0.66	0.22	0.63	0.17
17.....	0.65	0.20	0.66	0.22	0.63	0.17
18.....	0.65	0.20	0.65	0.20	0.63	0.17
19.....	0.66	0.22	0.65	0.20	0.63	0.17
20.....	0.66	0.22	0.64	0.19	0.63	0.17
21.....	0.66	0.22	0.64	0.19	0.63	0.17
22.....	0.66	0.22	0.64	0.19	0.63	0.17
23.....	0.66	0.22	0.64	0.19	0.63	0.17
24.....	0.66	0.22	0.64	0.19	0.63	0.17
25.....	0.66	0.22	0.64	0.19	0.63	0.17
26.....	0.66	0.22	0.64	0.19	0.63	0.17
27.....	0.66	0.22	0.64	0.19	0.63	0.17
28.....	0.66	0.22	0.64	0.19	0.63	0.17
29.....	0.66	0.22	0.63	0.17	0.63	0.17
30.....	0.66	0.22	0.63	0.17	0.63	0.17
31.....	0.66	0.22	.....	.....	0.62	0.15

MONTHLY DISCHARGE of Middle Creek, at McKinnon's Rancho, for 1910.

Drainage area, 125 square miles.

Month.	Discharge in Second-Feet.				Run-Off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on Drainage area.	Total in acre-feet.
June (21-30).....	0.44	0.31	0.38	0.0030	0.0011	8
July.....	1.45	0.20	0.44	0.0035	0.0040	27
August.....	0.34	0.18	0.23	0.0018	0.0021	14
September.....	0.39	0.20	0.25	0.0020	0.0022	16
October.....	0.24	0.20	0.22	0.0017	0.0020	13
November.....	0.22	0.17	0.20	0.0016	0.0018	12
December.....	0.17	0.15	0.17	0.0013	0.0015	10
The period.....	.....	.....	.....	.....	.....	100

MISCELLANEOUS DISCHARGE MEASUREMENTS of Lodge Creek Drainage Basin, in 1910.

DATE	Stream.	Locality.	Hydrographer.	Width.	Area of Section.	Discharge.
				<i>Feet.</i>		<i>Sec.-ft.</i>
July 29.....	Small, Branch of Middle Creek...	2-6-1-4.....	H. R. Carscallen..	* 1.25	.....	0.05
July 30.....	"	16-7-2-4.....	"	* 1.25	.....	0.02
July 13.....	Lodge Creek, E. Branch of.....	19-7-2-4.....	"	* 1.25	.....	0.02
June 14.....	Middle Creek.....	9-4-29-3.....	"	*	.....	0.1
July 9.....	"	"	"	*	.....	0.08
July 28.....	"	"	"	* 1.25	.....	0.03
August 15.....	"	"	"	*	.....	0.04
June 13.....	"	4-2-29-3.....	"	.....	.....	Nil.

* Weir measurements.

BATTLE CREEK DRAINAGE BASIN.

General Description.

Battle Creek rises in Tp. 8, Rge. 2, W. 4th Mer., and flows in an easterly direction for about eight miles, where it crosses the 4th Meridian then turns in a southeasterly direction and crosses the International Boundary in Sec. 3, Tp. 1, Rge. 26, W. 3rd Mer., eventually emptying into Milk River near Chinook, Montana. As is characteristic of the streams in this locality, the valley is narrow and deep near the source and gradually broadens out into large flats and meadows. These large flats are first noticed in the vicinity of Battle Creek P. O. Near the head of the stream the valley is well wooded with fair sized timber, but this diminishes to a growth of willow brush along the banks and finally disappears altogether.

The chief tributaries of Battle Creek are Tenmile Creek joining it in Sec. 4, Tp. 6, Rge 29, W. 3rd Mer., and Sixmile Coulee, joining it in Sec. 21, Tp. 6, Rge. 29, W. 3rd Mer. Stations have been established on both of these streams.

There are three stations on Battle Creek at the following places.—Nash's Ranche, Wilson's Ranche, and Tenmile Police Detachment. The latter station is located below the intake of Lindner Bros.' irrigation ditch, and a station was therefore established on the ditch.

BATTLE CREEK AT NASH'S RANCHE.

This station was established by N. M. Sutherland on May 11, 1910. It is located in Sec. 3, Tp. 3, Rge. 27, W. 3rd Mer., and is 270 feet west of E. R. Nash's house. It is about 70 miles by trail from Maple Creek.

Discharge measurements are made at low water and ordinary stages by wading, but during high water the stream cannot be waded and the discharge is computed from slope measurements.

The gauge rod which is of the standard type, is at the left bank and about 9 feet below the section. It is fastened to a 6 inch post driven into the bed of the stream. The bench mark, which is the top of a cedar post, is on the left bank, 55 feet from the edge. The initial point for soundings is the face of the B. M. marked 0.00 in red paint.

The stream is straight for about 250 feet above and about 300 feet below the station. The right bank is solid clay, high and not liable to overflow. The left bank is also of clay, but is low, and liable to overflow during high stages of the stream.

The stream flows in one channel about 45 feet wide at ordinary stages. The bed of the stream is composed of sand and gravel.

The gauge was read daily in 1910 by E. R. Nash.

DISCHARGE MEASUREMENTS of Battle Creek, at Nash's Ranche, in 1910.

DATE.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Dis-charge.
1910		<i>Feet.</i>	<i>Sq.-ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
May 11.....	N. M. Sutherland.....	47.2	23.7	0.71	1.05	18.4
May 17.....	F. H. Peters.....	43.0	20.7	0.78	1.03	16.4
June 4.....	"	22.7	7.23	0.34	0.68	2.43
July 9.....	N. M. Sutherland.....	.....	.....	.....	0.50	0.75*
July 15.....	F. H. Peters.....	.....	.....	.....	0.35	Nil.
July 27.....	N. M. Sutherland.....	.....	.....	.....	.....	Nil.
September 27.....	R. G. Swan.....	40.0	15.9	0.29	0.76	4.60
October 21.....	"	26.0	9.50	0.19	0.74	1.85

* Discharge determined by using floats.

DAILY GAUGE HEIGHT AND DISCHARGE of Battle Creek, at Nash's Ranche, for 1910.

DAY.	May.		June.		July.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....			0.60	1.60	0.55	1.15
2.....			0.67	2.45	0.55	1.15
3.....			0.85	6.30	0.55	1.15
4.....			0.70	2.90	0.70	2.90
5.....			0.65	2.20	0.55	1.15
6.....			0.62	1.85	0.54	1.05
7.....			0.65	2.20	0.45	0.45
8.....			0.65	2.20	0.45	0.45
9.....			0.70	2.90	0.53	1.00
10.....			0.72	3.20	0.48	0.60
11.....	1.05	18.0	0.70	2.90	0.45	0.45
12.....	1.07	19.8	0.65	2.20	0.45	0.45
13.....	1.05	18.0	0.65	2.20	0.45	0.45
14.....	1.05	18.0	0.70	2.90	0.40	0.20
15.....	0.95	10.6	0.70	2.90	0.35	0.00
16.....	0.95	10.6	0.72	3.20	*	
17.....	1.03	16.4	0.65	2.20		
18.....	1.02	15.4	0.68	2.60		
19.....	1.20	30.5	0.70	2.90		
20.....	1.00	13.9	0.65	2.20		
21.....	1.11	23.0	0.70	2.90		
22.....	1.00	13.9	0.70	2.90		
23.....	0.98	12.4	0.84	6.00		
24.....	0.98	12.4	0.80	4.95		
25.....	1.00	13.9	0.65	2.20		
26.....	0.98	12.4	0.60	1.60		
27.....	0.88	7.35	0.55	1.15		
28.....	0.85	6.30	0.55	1.15		
29.....	0.78	4.45	0.55	1.15		
30.....	0.75	3.80	0.55	1.15		
31.....	0.67	2.45				

* Creek dry from July 16 to Aug. 12.



Traffic Bridge at Swift Current, Sask.



Bridge over Bear Creek near Unsworth's Ranche.

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DAILY GAUGE HEIGHT AND DISCHARGE of Battle Creek, at Nash's Ranche, for 1910.—*Con.*

DAY.	August.		September.		October.		November.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....			0.68	2.60	0.76	4.00	0.95	10.6
2.....			0.65	2.20	0.80	4.95	0.97	11.8
3.....			0.63	1.95	0.78	4.45	0.90	8.15
4.....			0.65	2.20	0.78	4.45	0.85	6.30
5.....			0.63	1.95	0.80	4.95	0.94	10.0
6.....			0.68	2.60	0.77	4.20	0.94	10.0
7.....			0.70	2.90	0.80	4.95	0.90	8.15
8.....			0.75	3.80	0.84	6.00	0.97	11.8
9.....			0.83	5.70	0.80	4.95	0.98	12.4
10.....			0.83	5.70	0.79	4.65	1.05	18.0
11.....			0.85	6.30	0.85	6.30	0.95	10.6
12.....			0.85	6.30	0.85	6.30	1.04	17.2
13.....	0.30	0.00	0.90	8.15	0.85	6.30	1.10	22.2
14.....	0.55	1.15	0.90	8.15	0.85	6.30	1.20	30.5
15.....	0.55	1.15	0.90	8.15	0.85	6.30	1.15	26.4
16.....	0.47	0.55	0.88	7.35	0.86	6.65		
17.....	0.52	0.90	0.86	6.65	0.86	6.65		
18.....	0.53	1.00	0.85	6.30	0.87	7.00		
19.....	0.55	1.15	0.85	6.30	0.85	6.30		
20.....	0.53	1.00	0.85	6.30	0.76	4.00		
21.....	0.54	1.05	0.78	4.45	0.73	3.40		
22.....	0.54	1.05	0.78	4.45	0.64	2.05		
23.....	0.54	1.05	0.76	4.00	0.59	1.50		
24.....	0.60	1.60	0.75	3.80	0.55	1.15		
25.....	0.63	1.95	0.74	3.60	0.55	1.15		
26.....	0.60	1.60	0.76	4.00	0.55	1.15		
27.....	0.60	1.60	0.76	4.00	0.55	1.15		
28.....	0.60	1.60	0.75	3.80	0.50	0.75		
29.....	0.60	1.60	0.74	3.60	0.51	0.85		
30.....	0.62	1.85	0.74	3.60	0.54	1.05		
31.....	0.62	1.85			0.90	8.15		

MONTHLY DISCHARGE of Battle Creek, at Nash's Ranche, for 1910.

Drainage area, 502 square miles.

Month.	Discharge in Second-Feet.				Run-Off.	
	Maximum.	Minimum.	Mean:	Per square Mile.	Depth in inches on Drainage area.	Total in acre-feet.
May (11-31).....	30.5	2.45	13.5	0.027	0.021	562
June.....	6.30	1.15	2.64	0.005	0.006	157
July (1-15).....	2.90	0.00	0.90	0.001	0.001	250
August (13-31).....	1.95	0.00	1.32	0.026	0.173	470
September.....	8.15	1.95	4.69	0.009	0.010	279
October.....	8.15	0.75	4.26	0.008	0.009	262
November (1-15).....	30.50	6.30	14.30	0.028	0.016	425
The period.....						2,405

BATTLE CREEK AT WILSON'S RANCHE.

This station was established July 5, 1910, by H. R. Carscallen. It is situated below the intake of W. S. Wilson's ditch, which is in course of construction, about ten miles east of Battle Creek P. O.

The channel is straight for about 200 feet above and 125 feet below the station. Both banks are high, sparsely covered with brush and not liable to overflow. The bed is composed of sand and gravel.

The gauge is a plain staff, graduated to feet and hundredths, spiked to an upright post sunk into the bed of the stream at the left bank. It is referred to bench marks as follows:—(1) A spike head in the top of a willow stump 15 feet upstream; elevation, 7.12. (2) A spike-head in a hub driven close to the final point stake on the right bank; elevation, 12.68.

Discharge measurements are made at or near the station by wading. The initial point for soundings is a squared stake driven within 1 foot of the ground in the left bank 73 feet from the gauge height and marked I. P. 0.0.

The gauge is read once each day by W. S. Wilson, whose house is situated within ½ mile of the station.

DISCHARGE MEASUREMENTS of Battle Creek, at Wilson's Ranche, in 1910.

DATE.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Dis-charge.
		<i>Feet.</i>	<i>Sq.-ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
July 6.....	H. R. Carscallen.....	35.5	32.38	0.106	1.07	3.44
July 22.....	".....	34.0	30.37	0.088	1.04	2.68
August 10.....	".....	34.0	29.77	0.099	1.03	2.95
September 2.....	".....	35.0	31.36	0.095	1.06	2.99
September 27.....	R. G. Swan.....	35.5	37.22	0.189	1.22	7.05
October 20.....	".....	35.6	33.05	0.123	1.09	4.07

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DAILY GAUGE HEIGHT AND DISCHARGE of Battle Creek, at Wilson's Ranche, for 1910.

DAY.	July.		August.		September.		October.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.
1.....			1.00	2.30	1.10	4.10	1.26	8.32
2.....			1.00	2.30	1.12	4.54	1.27	8.64
3.....			1.00	2.30	1.13	4.76	1.26	8.32
4.....			1.00	2.30	1.17	5.72	1.25	8.00
5.....	1.08	3.70	1.20	2.62	1.25	8.00	1.25	8.00
6.....	1.07	3.50	1.16	5.46	1.30	9.60	1.26	8.32
7.....	1.08	3.70	1.04	2.94	1.34	10.96	1.30	9.60
8.....	1.08	3.70	1.04	2.94	1.37	12.06	1.30	9.60
9.....	1.08	3.70	1.04	2.94	1.39	12.82	1.30	9.60
10.....	1.08	3.70	1.02	2.62	1.40	13.20	1.30	9.60
11.....	1.08	3.70	1.02	2.62	1.35	11.30	1.30	9.60
12.....	1.08	3.70	1.02	2.62	1.30	9.60	1.30	9.60
13.....	1.07	3.50	1.04	2.94	1.32	10.28	1.28	8.96
14.....	1.07	3.50	1.02	2.62	1.33	10.62	1.27	8.64
15.....	1.06	3.30	1.02	2.62	1.30	9.60	1.26	8.32
16.....	1.05	3.10	1.02	2.62	1.28	8.96	1.20	6.50
17.....	1.04	2.94	1.01	2.46	1.26	8.32	1.04	2.94
18.....	1.00	2.30	1.01	2.46	1.23	7.40	1.11	4.32
19.....	1.04	2.94	1.00	2.30	1.21	6.80	1.10	4.10
20.....	1.05	3.10	1.00	2.30	1.20	6.50	1.10	4.10
21.....	1.05	3.10	1.01	2.46	1.19	6.24	1.15	5.20
22.....	1.05	3.10	1.02	2.62	1.18	5.98	1.35	11.30
23.....	1.07	3.50	1.03	2.78	1.19	6.24	1.35	11.30
24.....	1.07	3.50	1.02	2.62	1.19	6.24	1.35	11.30
25.....	1.06	3.30	1.02	2.62	1.16	5.46	1.32	10.28
26.....	1.05	3.10	1.02	2.62	1.16	5.46	1.31	9.94
27.....	1.04	2.94	1.02	2.62	1.21	6.80	1.35	11.30
28.....	1.02	2.62	1.03	2.78	1.22	7.10	1.40	13.20
29.....	1.01	2.46	1.03	2.78	1.24	7.70	1.45	15.20
30.....	1.00	2.30	1.04	2.94	1.25	8.00	1.40	13.20
31.....	1.00	2.30	1.09	3.90	.....	.....	1.38	12.44

MONTHLY DISCHARGE of Battle Creek, at Wilson's Ranche, for 1910.
Drainage area, 263 square miles.

Month.	Discharge in Second-Feet.			Run-Off.		
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on Drainage area.	Total in acre-feet.
July (5-31).....	3.7	2.3	3.20	.012	.013	171
August.....	5.5	2.3	2.74	.010	.012	169
September.....	13.2	4.1	8.01	.030	.033	477
October.....	15.2	2.9	9.02	.034	.039	555
The period.....						1,372

BATTLE CREEK AT TENMILE POLICE DETACHMENT

This station was established June 3, 1909, by F. T. Fletcher. It is located below the mouth of Tenmile Creek at the highway bridge on the surveyed trail from Maple Creek to Tenmile and about 400 yards from the Tenmile Police Detachment. It is practically in the centre of Sec. 33, Tp. 5, Rge. 29, W. 3rd Mer., about two miles south of Battle Creek post office and 55 miles south of Maple Creek. The bridge is a steel structure of the pony truss type, consisting of one 80 foot span, supported by two timber, rock-filled piers and having a twenty-foot approach at each end of the bridge. There is only one channel at all ordinary stages of the stream, but, owing to the presence of the two piers supporting the pony truss, there are three channels in cases of extreme floods.

This channel is straight for 500 feet above and 300 feet below the station. Both banks are high and not liable to overflow except in extreme floods, when the water breaks over the right bank some distance above the station and flows around the gauge. The right bank is free of brush for some distance above and below the station; the left bank is sparsely covered with willows near the station. The bed of the stream is sandy and may shift somewhat in high stages of the stream. The current is very sluggish, and at very low stages vegetation appears in the bed of the stream at the station.

A standard chain gauge, is located about the centre of the steel truss and is securely fastened to the guard-rail on the downstream side of the bridge. The length of the chain from the bottom of the weight to the marker is 19.10 feet. The gauge is referred to bench marks as follows:— (1) A bolthead in the top of the left pier on the downstream side of the bridge, marked B. M. in black paint; elevation, 13.97 feet above the datum of the gauge. (2) The top of the iron pin in road mound at the corner of the police fence, about 20 feet from the bridge on the left bank: elevation, 13.51 feet above the datum of the gauge.

Discharge measurements are made from the downstream side of the bridge. The initial point for soundings is the inner face of the right abutment and marked 0 in black paint. Low-water measurements are made at a wading section about 400 yards upstream from the station.

The gauge was read once each day by Const. W. A. Doak, of the R. N. W. M. P., until the 1st of May, 1910, when H. M. Covey took charge of the gauge height observations.

DISCHARGE MEASUREMENTS of Battle Creek, at Tenmile Police Detachment, in 1910.

DATE.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Dis-charge.
		<i>Feet.</i>	<i>Sq.-ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
April 22.....	H. R. Carscallen.....	31.5	55.35	0.574	2.96	31.75
May 16.....	".....	32.0	52.77	0.709	3.03	37.43
June 10.....	".....	26.0	37.42	0.155	2.49	5.80
July 2.....	".....	26.0	40.98	0.031	2.17	1.28*
July 25.....	".....	26.0	33.21	0.036	2.14	1.21*
August 13.....	".....	26.0	39.32	0.056	2.29	2.20*
September 5.....	".....	29.5	43.57	0.174	2.52	7.56
September 28.....	R. G. Swan.....	30.5	51.43	0.196	2.59	10.12

* Discharge determined by using a 36 inch weir.

DAILY GAUGE HEIGHT AND DISCHARGE of Battle Creek, at Tenmile Police Detachment, for 1910

DAY.	April.		May.		June.		July.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	3.4	67.5	2.8	20.5	2.5	7.0	2.25	2.0
2.....	3.4	67.5	2.7	15.0	2.5	7.0	2.2	1.5
3.....	3.4	67.5	2.7	15.0	2.5	7.0	2.2	1.5
4.....	3.3	59.0	2.7	15.0	2.5	7.0	2.2	1.5
5.....	3.3	59.0	2.7	15.0	2.5	7.0	2.2	1.5
6.....	3.2	50.5	2.7	15.0	2.5	7.0	2.4	4.0
7.....	3.2	50.5	2.7	15.0	2.5	7.0	2.4	4.0
8.....	3.2	50.5	2.9	27.5	2.5	7.0	2.4	4.0
9.....	3.2	50.5	2.9	27.5	2.5	7.0	2.4	4.0
10.....	3.2	50.5	2.9	27.5	2.5	7.0	2.4	4.0
11.....	3.2	50.5	2.9	27.5	2.5	7.0	2.4	4.0
12.....	3.2	50.5	2.9	27.5	2.5	7.0	2.4	4.0
13.....	3.2	50.5	2.9	27.5	2.45	6.5	2.4	4.0
14.....	3.2	50.5	2.9	27.5	2.45	6.5	2.35	3.25
15.....	3.1	42.5	3.0	35.0	2.4	4.0	2.15	1.12
16.....	3.0	35.0	3.0	35.0	2.45	6.5	2.15	1.12
17.....	3.0	35.0	2.9	27.5	2.6	10.5	2.1	1.0
18.....	3.0	35.0	2.9	27.5	2.6	10.5	2.1	1.0
19.....	3.0	35.0	2.9	27.5	2.55	8.75	2.1	1.0
20.....	3.0	35.0	2.9	27.5	2.5	7.0	2.1	1.0
21.....	3.0	35.0	2.9	27.5	2.5	7.0	2.1	1.0
22.....	2.9	27.5	2.8	20.5	2.5	7.0	2.1	1.0
23.....	2.9	27.5	2.8	20.5	2.5	7.0	2.1	1.0
24.....	2.9	27.5	2.8	20.5	2.5	7.0	2.1	1.0
25.....	2.9	27.5	2.8	20.5	2.45	5.5	2.14	1.2
26.....	2.9	27.5	2.7	15.0	2.4	4.0	2.14	1.2
27.....	2.9	27.5	2.7	15.0	2.4	4.0	2.15	1.25
28.....	2.9	27.5	2.6	10.5	2.4	4.0	2.17	1.35
29.....	2.8	20.5	2.6	10.5	2.35	3.25	2.18	1.40
30.....	2.8	20.5	2.55	18.75	2.3	2.5	2.19	1.45
31.....			2.50	7.0			2.20	1.50

DAILY GAUGE HEIGHT AND DISCHARGE of Battle Creek, at Tenmile Police Detachment, for 1910.
Continued.

DAY.	August.		September.		October.		November.	
	Gauge. Height.	Dis- charge.	Gauge Height.	Dis- charge.	Gauge Height.	Dis- charge.	Gauge Height.	Dis- charge.
	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.
1.....	2.20	1.50	2.45	5.50	2.56	9.10	2.55	8.75
2.....	2.20	1.50	2.47	6.10	2.55	8.75	2.56	9.10
3.....	2.21	1.60	2.48	6.40	2.54	8.40	2.56	9.10
4.....	2.23	1.80	2.50	7.00	2.54	8.40	2.62	11.40
5.....	2.25	2.00	2.52	7.70	2.54	8.40	2.65	12.75
6.....	2.26	2.10	2.57	9.45	2.54	8.40	2.68	14.10
7.....	2.26	2.10	2.62	11.40	2.54	8.40	2.70	15.00
8.....	2.26	2.10	2.67	13.65	2.54	8.40	2.70	15.00
9.....	2.27	2.20	2.65	12.75	2.53	8.05	2.69	14.55
10.....	2.28	2.30	2.63	11.85	2.53	8.05	2.68	14.10
11.....	2.28	2.30	2.61	10.95	2.52	7.70	2.68	14.10
12.....	2.29	2.40	2.59	10.15	2.52	7.70	2.68	14.10
13.....	2.29	2.40	2.57	9.45	2.52	7.70	2.67	13.65
14.....	2.31	2.65	2.55	8.75	2.51	7.35	2.66	13.20
15.....	2.33	2.95	2.52	7.70	2.51	7.35	2.65	12.75
16.....	2.35	3.25	2.52	7.70	2.51	7.35	2.64	12.30
17.....	2.39	3.85	2.52	7.70	2.51	7.35	2.63	11.85
18.....	2.42	4.60	2.51	7.35	2.52	7.70	2.61	10.95
19.....	2.37	3.55	2.51	7.35	2.53	8.05	2.60	10.50
20.....	2.36	3.40	2.50	7.00	2.54	8.40	2.59	10.15
21.....	2.32	2.80	2.50	7.00	2.55	8.75	2.58	9.80
22.....	2.34	3.10	2.50	7.00	2.56	9.10	2.56	9.10
23.....	2.37	3.55	2.51	7.35	2.56	9.10	2.54	8.40
24.....	2.39	3.85	2.53	8.05	2.56	9.10	2.53	8.05
25.....	2.40	4.00	2.55	8.75	2.56	9.10	2.52	7.70
26.....	2.42	4.60	2.57	9.45	2.56	9.10	2.52	7.70
27.....	2.44	5.20	2.59	10.15	2.55	8.75	2.52	7.70
28.....	2.44	5.20	2.60	10.50	2.55	8.75	.....	.....
29.....	2.44	5.20	2.59	10.15	2.55	8.75	.....	.....
30.....	2.44	5.20	2.57	9.45	2.55	8.75	.....	.....
31.....	2.44	5.20	.....	.....	2.55	8.75	.....	.....

NOTE:—Run-off for Battle Creek cannot be computed as Lindner's Ditch is diverted above the station and records of the flow in this ditch are incomplete.

TENMILE CREEK, AT TENMILE POLICE DETACHMENT.

This station was established July 21, 1909, by H. R. Carscallen. It is located about 300 yards west of the Tenmile Police Detachment near the mouth of the stream. The station is very close to the south boundary of Sec. 4, Tp. 6, Rge. 29, W. 3rd Mer., almost on the quartering line of the section and about 2 miles south of Battle Creek post office.

The channel is straight for 15 feet above and 20 feet below the station. Both banks are high, free from brush and not liable to overflow. The bed of the stream is composed of sand and coarse gravel. There is a small rapid above the station, but the current at the station is rather sluggish.

The gauge, which is read once each day by H. M. Covey, is a plain staff, graduated to feet and hundredths, nailed to an upright post sunk in the bed of the stream at the right bank and securely stayed to the bank. The gauge is referred to bench marks as follows:—(1) The top of the initial point stake driven close to the ground on the left bank and marked B. M. in red paint; elevation, 5.84 feet above the zero of the gauge. (2) The head of a spike driven into the pointed top of a willow stump about 100 feet downstream from the station on the right bank, the stump blazed and marked B. M. in red paint; elevation, 6.15 feet above the zero of the gauge.

Discharge measurements are made at or near the gauge by wading, and at very low stages a weir is used. The initial point for soundings is a square stake close to the ground on the left bank and marked I. P. o. o with red paint.

DISCHARGE MEASUREMENTS of Tenmile Creek, at Tenmile Police Detachment, in 1910.

Date.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Dis-charge.
		<i>Feet.</i>	<i>Sq. ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
April 22.....	H. R. Carscallen.....	3.6	1.78	0.233	0.94	0.41
May 16.....	".....				0.90	0.34
June 10.....	".....	4.3	1.58	0.128	0.87	0.20
July 2.....	".....	3.3	1.53	0.139	0.84	0.21
July 25.....	".....	3.5	1.96	0.092	0.96	0.18
August 13.....	".....	3.5	2.44	0.107	1.10	0.26
September 5.....	".....	4.8	3.46	0.068	1.31	0.24
September 28.....	R. G. Swan.....	5.4	5.80	0.025	1.71	0.15
October 25.....	".....	5.2	5.81	0.035	1.76	0.20

Discharges determined by using a 15" weir.

SIXMILE COULEE AT SODERSTROM'S RANCHE.

This station was established July 22, 1909, by H. R. Carscallen. It is located on Sec. 29, Tp. 7, Rge. 28, W. 3rd Mer., 200 yards west of the surveyed trail from Maple Creek to Tenmile and about thirty miles south of Maple Creek.

The channel is straight for 50 feet above and 20 feet below the station. Both banks are high and not liable to overflow. The right bank is sparsely covered with brush; the left bank is free of brush. The bed of the stream is composed of sand and very coarse gravel with clay at the banks. The current is moderate. A small amount of vegetation is present at the station.

The gauge, which is read once each day by J. M. Soderstrom, is a plain staff, graduated to feet and hundredths, nailed to an upright post sunk in the bed of the creek at the right bank, and securely stayed to the bank. The gauge is referred to bench marks as follows:—(1) A nail-head driven into the top of a pointed willow stump on the right bank, about 150 feet upstream from the gauge, the stump blazed and marked B. M. in red paint; elevation, 7.77 feet above gauge zero. (2) Nail-heads in the top of a log near the ground at the southeast corner of Mr. Soderstrom's north stable; elevation, 18.08 feet above gauge zero.

Discharge measurements are made at or near the station by wading, and at very low stages a weir is used. The initial point for soundings is a square stake driven close to the ground on the left bank and marked I. P. 0. 0 in red paint.

DISCHARGE MEASUREMENTS of Sixmile Coulee, at Soderstrom's Rancho, in 1910.

Date.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Dis-charge.
		<i>Feet.</i>	<i>Sq. ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
April 23.....	H. R. Carscallen.....	4.5	4.34	0.636	1.25	2.76
May 17.....	".....	15.0	4.72	1.354	1.69	6.39
June 23.....	".....	2.4	2.46	0.239	0.79	0.59*
July 15.....	".....				0.49	0.03*
August 3.....	".....				0.40	Nil.
August 18.....	".....	4.0	0.95	0.073	0.56	0.07*
September 6.....	".....	3.8	2.35	0.374	0.86	0.88
September 8.....	".....	4.0	2.79	0.581	1.00	1.62
September 29.....	R. G. Swan.....	4.0	1.75	0.150	0.66	0.25*

* Discharge determined by using a 15 inch weir.

SESSIONAL PAPER No. 25d

DAILY GAUGE HEIGHT AND DISCHARGE of Sixmile Coulee, at Soderstrom's Ranche, for 1910.

Day.	April.		May.		June.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	2.1	10.7	1.1	1.9	1.1	1.9
2.....	2.2	11.8	1.2	2.4	1.0	1.4
3.....	2.2	11.8	1.2	2.4	1.3	3.1
4.....	2.3	13.0	1.1	1.9	1.1	1.9
5.....	2.2	11.8	1.1	1.9	1.1	1.9
6.....	2.2	11.8	1.1	1.9	1.0	1.4
7.....	2.1	10.7	1.1	1.9	1.0	1.4
8.....	2.1	10.7	1.1	1.9	0.9	0.95
9.....	2.1	10.7	1.1	1.9	0.9	0.95
10.....	2.0	9.6	1.1	1.9	0.9	0.95
11.....	2.0	9.6	1.4	3.8	0.8	0.60
12.....	1.9	8.5	1.3	3.1	1.0	1.40
13.....	1.9	8.5	1.3	3.1	0.9	0.95
14.....	1.8	7.5	1.3	3.1	0.9	0.95
15.....	1.7	6.5	1.3	3.1	0.8	0.60
16.....	1.6	5.5	1.85	8.0	0.8	0.60
17.....	1.6	5.5	1.8	7.5	0.8	0.60
18.....	1.5	4.6	1.5	4.6	1.0	1.40
19.....	1.4	3.8	1.6	5.5	0.8	0.60
20.....	1.5	4.6	1.6	5.5	0.9	0.95
21.....	1.4	3.8	1.5	4.6	0.8	0.60
22.....	1.4	3.8	1.4	3.8	0.7	0.35
23.....	1.3	3.1	1.3	3.1	0.8	0.60
24.....	1.3	3.1	1.2	2.4	0.8	0.60
25.....	1.3	3.1	1.1	1.9	0.7	0.35
26.....	1.2	2.4	1.0	1.4	0.	0.35
27.....	1.2	2.4	0.9	0.95	0.6	0.15
28.....	1.1	1.9	1.1	1.9	0.5	0.05
29.....	1.0	1.4	1.1	1.9	0.6	0.15
30.....	1.0	1.4	1.0	1.4	0.5	0.05
31.....			1.1	1.9		

DAILY GAUGE HEIGHT AND DISCHARGE of Sixmile Coulee, at Soderstrom's Ranche, for 1910.—*Con.*

Day.	July.		August.		September.		October.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	0.7	0.35	0.4	0.0	0.5	0.05	0.7	0.35
2.....	0.9	0.95	0.4	0.0	0.4*	0.0	0.7	0.35
3.....	0.8	0.60	0.4	0.0	0.4	0.0	0.7	0.35
4.....	0.9	0.95	0.4	0.0	0.4	0.0	0.6	0.15
5.....	0.8	0.6	0.4	0.0	0.4	0.0	0.9	0.95
6.....	0.6	0.15	0.8	0.60	0.4	0.0	0.8	0.60
7.....	0.6	0.15	0.7	0.35	0.9	0.95	0.8	0.60
8.....	0.6	0.15	0.6	0.15	0.9	0.95	0.7	0.35
9.....	0.9	0.95	0.6	0.15	0.8	0.60	0.7	0.35
10.....	0.7	0.35	0.6	0.15	0.7	0.35	0.7	0.35
11.....	1.0	1.40	0.5	0.05	0.9	0.95	0.7	0.35
12.....	0.7*	0.35	0.5	0.05	0.8	0.60	0.7	0.35
13.....	0.7	0.35	0.5	0.05	0.8	0.60	0.7	0.35
14.....	0.6	0.15	0.7	0.35	0.8	0.60	0.7	0.35
15.....	0.5	0.05	0.8	0.60	0.8	0.60	0.7	0.35
16.....	0.4	0.0	0.7	0.35	0.8	0.60	0.7	0.35
17.....	0.4	0.0	0.6	0.15	0.8	0.60	0.7	0.35
18.....	0.4	0.0	0.6	0.15	0.8	0.60	0.7	0.35
19.....	0.4	0.0	0.5	0.05	0.8	0.60	1.0	1.40
20.....	0.4	0.0	0.5	0.05	0.7	0.35	1.0	1.40
21.....	0.4	0.0	0.5	0.05	0.7	0.35	0.9	0.95
22.....	0.4	0.0	0.4*	0.0	0.7	0.35	0.9	0.95
23.....	0.4	0.0	0.4	0.0	0.7	0.35	0.8	0.60
24.....	0.4	0.0	0.8	0.60	0.9	0.95	0.8	0.60
25.....	0.4	0.0	0.8	0.60	0.9	0.95	0.7	0.35
26.....	0.4	0.0	0.7	0.35	0.8	0.60	0.7	0.35
27.....	0.4	0.0	0.7	0.35	0.8	0.60	0.9	0.95
28.....	0.4	0.0	0.6	0.15	0.8	0.60	1.0	1.40
29.....	0.4	0.0	0.6	0.15	0.7	0.35	0.9	0.95
30.....	0.4	0.0	0.5	0.05	0.7	0.35	0.9	0.95
31.....	0.4	0.0	0.5	0.05	.....	.....	0.9	0.95

* No flow, water standing in pools, July 16-Aug. 5, Aug. 22-23, and Sept. 2-6.

MONTHLY DISCHARGE of Sixmile Coulee, at Soderstrom's Ranche, for 1910.

Drainage area, 21 square miles.

Month.	Discharge in Second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on Drainage area.	Total in acre-feet.
April.....	13.00	1.40	6.79	0.323	0.360	404
May.....	8.00	0.95	2.99	0.142	0.164	184
June.....	3.10	0.05	0.92	0.044	0.049	55
July.....	1.40	0.00	0.24	0.011	0.013	15
August.....	0.60	0.00	0.18	0.009	0.010	11
September.....	0.95	0.00	0.48	0.023	0.026	29
October.....	1.40	0.15	0.61	0.029	0.033	38
The period.....						736

LINDNER'S DITCH, NEAR BATTLE CREEK.

This station was established July 26, 1910, by H. R. Carscallen. It is located on Sec. 10, Tp. 6, Rge. 29, W. 3rd Mer., about 100 feet west of the surveyed trail to Maple Creek. It is about a 1/4 of a mile south of Battle Creek P. O., and about 500 yards below the intake of the ditch. The channel is straight for 200 feet above and 150 feet below the station, where it curves sharply to the right and enters Lindner Bros.' hay meadow. Here it is diverted into a number of different laterals for irrigation purposes. The bed of the ditch is composed of clay and coarse gravel. The current is swift below the station.

The gauge is a plain staff, graduated to feet and hundredths, driven firmly into the bed of the ditch near the right bank about twelve feet upstream from the weir.

Discharge measurements are made by means of a rectangular sharp-crested weir with complete end contractions. A 36 inch steel weir was established temporarily on July 26th and replaced on August 12th by a permanent 42 inch wooden weir.

The irrigation season was practically over at the time the station was established, very little water being diverted into the ditch after the 26th of July. No record of water diverted from Battle Creek into the ditch was obtained before this date and hence records of the total flow past the station on Battle Creek on Sec. 33, Tp. 5, Rge. 29, W. 3rd Mer., are incomplete for the previous months.

DISCHARGE MEASUREMENTS of Lindner's Ditch, near Battle Creek, in 1910.

Date.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Dis-charge.
		<i>Feet.</i>	<i>Sq. ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
June 11.....	H. R. Carscallen	7.3	3.59	1.605	.....	5.76
July 4.....	"	7.8	3.76	1.388	.....	5.22
July 26.....	"				3.385	3.26*
July 27.....	"				3.01	0.36*
August 12.....	"				2.95	0.07*
August 12.....	"				3.03	0.06†
September 5.....	"				3.05	0.09†
September 29.....	R. G. Swan.....				3.04	0.04†
October 26.....	"				3.04	0.04†

* Discharge determined by using a 36 inch weir.
† Discharge determined by using a 42 inch weir.

DAILY GAUGE HEIGHT AND DISCHARGE of Lindner's Ditch, near Battle Creek, for 1910.

Day.	July.		August.		September.		October.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Discharge.
	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.
1.....			2.95	0.07	3.05	0.08		
2.....			2.95	0.07	3.05	0.08		
3.....			2.95	0.07	3.05	0.08		
4.....			2.95	0.07	3.06	0.09		
5.....			2.95	0.07	3.06	0.09		
6.....			2.95	0.07	3.06	0.09		
7.....			2.95	0.07	3.06	0.09	3.05	0.04
8.....			2.95	0.07	3.06	0.09	3.05	0.04
9.....			2.95	0.07	*		3.05	0.04
10.....			2.95	0.07			3.05	0.04
11.....			2.95	0.07			3.05	0.04
12.....			2.95	0.70			3.05	0.04
13.....			3.04	0.07			3.05	0.04
14.....			3.04	0.07				
15.....			3.04	0.07				
16.....			3.00†	0.0				
17.....			3.00	0.0				
18.....			3.00	0.0				
19.....			3.04	0.07				
20.....			3.04	0.07				
21.....			3.04	0.07				
22.....			3.04	0.07				
23.....			3.03	0.06				
24.....			3.03	0.06				
25.....			3.03	0.06				
26.....	3.38	3.26	3.04	0.07				
27.....	3.00	0.36	3.04	0.07				
28.....	3.00	0.36	3.05	0.08				
29.....	3.00	0.36	3.05	0.08				
30.....	2.95	0.07	3.05	0.08				
31.....	2.95	0.07	3.04	0.07				

* No observer from September 8th to October 7th.
† No flow, water standing in pools, August 16-18.

MISCELLANEOUS DISCHARGE MEASUREMENTS of Battle Creek Drainage Basin, in 1910.

DATE	Stream.	Locality.	Hydrographer	Width.	Area of Section.	Discharge.
				Feet.		Sec.-ft.
June 9.....	Battle Creek.....	1-6-28-3.....	H. R. Carscallen..	22.0	17.0	7.43
June 11.....	".....	23-8-1-4.....	F. T. Fletcher....	5.3	3.88	5.75
June 30.....	".....	30-5-28-3.....	H. R. Carscallen..	17.5	6.63	4.03
July 6.....	".....	20-4-26-3.....	".....	8.5	3.48	0.88
July 15.....	".....	21-7-29-3.....	".....	21.5	8.87	2.54
August 2.....	".....	31-7-29-3.....	".....	9.5	5.76	2.25
August 10.....	".....	20-4-26-3.....	".....	13	4.92	2.16
August 11.....	".....	29-5-28-3.....	".....	13.3	5.31	2.56
August 18.....	".....	29-7-29-3.....	".....	11.7	6.07	4.47
August 1.....	Creek, Branch of Battle Creek....	21-7-29-3.....	".....	* 1.25		0.03
August 17.....	".....	".....	".....	* 1.25		0.13
June 13.....	Fourmile Creek...	S.W. 12-8-29-3....	F. T. Fletcher....	4.0	1.29	1.49
June 15.....	Graburn Creek....	13-8-1-4.....	".....	6.4	2.78	2.14
July 14.....	".....	".....	H. R. Carscallen..	7.5	2.46	1.28
August 2.....	".....	".....	".....	7.5	2.09	0.9
August 17.....	".....	".....	".....	6.5	1.99	1.31
June 9.....	Marshall Gaff Ditch	27-5-29-3.....	".....	12.	10.41	9.94
July 4.....	".....	34-5-29-3.....	".....	6.6	4.89	2.14
July 27.....	".....	".....	".....	3.2	1.88	1.18
August 13.....	".....	".....	".....	*		0.59
September 28...	".....	".....	R. G. Swan.....	8.5	8.95	3.82
October 25.....	".....	".....	".....	6.3	7.44	3.16
October 20.....	McKinnon's Ditch	30-4-26-3.....	".....	9.6	6.5	2.92
July 15.....	Mink Creek.....	S.E. 31-7-29-3....	H. R. Carscallen..	*		0.03
August 18.....	".....	".....	".....	*		0.08
July 6.....	Richardson's Ditch.	31-4-26-3.....	".....	7.0	2.21	1.97
July 22.....	".....	".....	".....	*		0.54
July 15.....	Wood & Anderson's Ditch.....	21-7-29-3.....	".....	*		0.02

* Weir measurements.



Irrigating an oat field at Enright & Strong's Rancho, near East End, Sask.



Irrigating an oat field at Enright & Strong's Rancho, near East End, Sask.

FRENCHMAN RIVER DRAINAGE BASIN.

General Description.

Frenchman River rises on the southern slope of the Cypress Hills, in Cypress Lake, which is in Tp. 6, Rge. 26, W. 3rd Mer. This lake is about ten miles long and from one to three miles wide, and receives its water supply from a number of small streams, which rise in the hills and flow south to the lake. The largest and most important of these feeders are Oxarart and Sucker Creeks.

After leaving the lake the river receives a further supply from Belanger, Davis and Fairwell Creeks, and a number of coulees. After joining the North Branch in Tp. 6, Rge. 23, W. 3rd Mer., the river receives no appreciable supply while it is in Canada. It crosses the International Boundary in Tp. 1, Rge. 10, W. 3rd Mer., and eventually finds its way into Milk River, near Saco, Montana.

Near the source of the river it flows through a deep valley from two to three hundred feet in depth and from one to two miles wide. After passing East End it widens out, in some places, to a distance of four miles, the depth of the valley increasing to three and four hundred feet.

The bench land along the stream is of rolling prairie, broken by a large number of coulees, which increase in number as you approach the source of the river.

The mean annual rainfall in the drainage basin is about 16 inches, most of it occurring during the months of May, June and July. From November to April the streams are frozen over, and usually there is an abundant snow fall. There are a number of small irrigation ditches in this basin. Enright and Strong's ditch at East End, designed to cover about 3,000 acres, is the largest.

FRENCHMAN RIVER, AT HUFF'S RANCHE.

This station was established on May 23, 1910, by F. H. Peters. It is located in Sec. 5, Tp. 5, Rge. 14, W. 3rd Mer., at Huff's Ranche. It is 40 miles by trail from Notre Dame, D'Auvergne P. O., and 75 miles from Swift Current.

During low stages of the stream, discharge measurements are made by wading. The initial point for soundings is the face of post on the left bank, and marked 0+00. When the stream becomes too deep for wading, the discharge is determined by the slope method.

The gauge, which is a plain staff, graduated to feet and hundredths, is fixed to a post at the left bank. It is referred to the top of the post at the initial point for soundings; elevation, 9.75 feet above the datum of the gauge. It was read during 1910, by Roy Wright.

DISCHARGE MEASUREMENTS of Frenchman River, at Huff's Ranche, in 1910.

DATE	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Discharge.
		<i>Feet.</i>	<i>Sq.-ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
May 23.....	F. H. Peters.....	37.8	39.54	0.816	2.44	35.27
July 13.....	R. G. Swan.....	31.0	14.37	0.212	1.775	3.05
August 23.....	R. G. Swan.....					Dry.

DAILY GAUGE HEIGHT AND DISCHARGE of Frenchman River, at Huff's Ranche, for 1910.

DAY.	May.		June.		July.		November.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.
1.....			2.15	15.1	1.94	6.4		
2.....			2.09	12.0	1.91	5.7	1.71	2.3
3.....			2.10	12.5	1.85	4.4	1.80	3.5
4.....			2.08	11.5	1.85	4.4	1.57	1.05
5.....			2.07	11.1	1.86	4.6	1.89	5.2
6.....			2.05	10.2	1.84	4.2	1.92	5.9
7.....			2.03	9.5	1.79	3.35	1.97	7.3
8.....			2.00	8.35	1.77	3.05	1.93	6.2
9.....			1.98	7.6	1.77	3.05	1.86	4.6
10.....			1.95	6.7	1.85	4.4	1.99	7.9
11.....			1.93	6.2	1.80	3.5	2.04	9.8
12.....			1.91	5.7	1.70	2.2	2.12	13.5
13.....			1.89	5.2	1.73	2.55	2.22	19.2
14.....			1.89	5.2	1.70	2.2	2.22	19.2
15.....			1.89	5.2	1.66	1.8	2.18	16.8
16.....			1.89	5.2	1.60	1.25		
17.....			1.88	5.0	1.55	0.9		
18.....			1.88	5.0	1.54	0.85		
19.....			1.92	5.9	1.53	0.8		
20.....			1.95	6.7	1.50	0.6		
21.....			1.90	5.45	1.47	0.5		
22.....	2.44	35.3	1.93	6.2	1.45	0.4		
23.....	2.44	35.3	1.94	6.4	1.42	0.2		
24.....	2.44	35.3	1.94	6.4	1.40	0.15		
25.....	2.43	34.7	1.94	6.4	1.40			
26.....	2.35	28.5	1.93	6.2	1.33	0.0		
27.....	2.34	27.6	1.93	6.2		*		
28.....	2.32	26.1	1.90	5.45				
29.....	2.32	26.1	1.95	6.7				
30.....	2.23	19.9	1.94	6.4				
31.....	2.18	16.8						

* River dry from July 26 to Nov. 1.

MONTHLY DISCHARGE of Frenchman River, at Huff's Ranche, for 1910.

Drainage area, 1,416 square miles.

Month.	Discharge in Second-Feet.				Run-Off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on Drainage area.	Total in acre-feet.
May (22-31).....	35.3	16.8	28.56	0.020	0.007	566
June.....	15.1	5.0	7.42	0.005	0.006	441
July (1-26).....	6.4	0.0	2.37	0.002	0.002	122
November (1-15).....	19.2	1.05	8.74	0.006	0.003	244
The period.....						1,373

FRENCHMAN RIVER, NEAR EAST END.

This station was established July 31, 1908, by F. T. Fletcher. It is located at the Enright and Strong highway bridge on the N. E. $\frac{1}{4}$ Sec. 31, Tp. 6, Rge. 21, W. 3rd Mer. It is about eight miles south of East End post office and a mile above the East End Police Detachment. Three miles above the station are the dam and headgates of Messrs. Enright and Strong's ditch, and hence the discharge of the stream at the station does not include that of the ditch and the latter must be added in order to obtain the total flow of the Frenchman River. The bridge is a single span, wooden structure set upon timber, rock-filled abutments.

The channel is straight for 400 feet above and 600 feet below the station. Both banks are high and not liable to overflow. The bed of the stream is composed of sand and gravel. The current is sluggish.

SESSIONAL PAPER No. 25d

The gauge, a plain staff graduated to feet and hundredths, is attached vertically to the upstream side of the left abutment of the bridge. It was read daily during the season of 1910, by D. Savage. The gauge is referred to bench marks as follows:—(1) Nail-head in the top of a long pile at the left bank and 10 feet above the bridge; elevation, 15.89 feet above the zero of the gauge. (2) Nail-heads in the top of the stringer on the left abutment at the upstream side of the bridge, marked B. M. in red paint; elevation, 13.93 feet above the zero of the gauge.

Discharge measurements are made from the lower side of the bridge at high water stages, and at a wading section a short distance upstream at low water stages. The initial point for soundings is the inner face of the left abutment. The bridge is not quite at right angles to the direction of the current.

DISCHARGE MEASUREMENTS of Frenchman River, near East End, in 1910.

Date.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Dis-charge.
		<i>Feet.</i>	<i>Sq. ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
April 18.....	H. R. Carscallen.....	37.5	83.65	0.76	2.04	63.57
May 11.....	".....	37.5	64.93	0.547	1.75	35.59
May 31.....	".....	37.5	55.43	0.16	1.35	8.88
June 17.....	R. G. Swan.....	38	55.53	0.153	1.36	8.52
July 15.....	".....	40	47.75	0.016	1.1	0.77
August 3.....	R. J. Burley.....					0.22*
August 3.....	".....					0.24*
August 4.....	R. G. Swan.....	39	45.13	0.005	1.06	0.22*
August 6.....	R. J. Burley.....					0.29*
August 8.....	".....					0.4 *
August 11.....	".....				1.07	0.24*
August 16.....	".....				1.14	0.66*
August 26.....	R. G. Swan.....	39	45.67	0.008	1.1	0.36*
September 16.....	".....	39	44.89	0.021	1.13	0.92*
October 12.....	".....	49	57.07	0.011	1.11	0.72

* Discharge determined by using 36 inch weir.

DAILY GAUGE HEIGHT AND DISCHARGE of Frenchman River, near East End, for 1910.

Day.	April.		May.		June.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....			1.85	44.2	1.30	6.0
2.....			1.85	44.2	1.30	6.0
3.....			1.85	44.2	1.30	6.0
4.....			1.85	44.2	1.30	6.0
5.....			1.85	44.2	1.30	6.0
6.....			1.85	44.2	1.30	6.0
7.....			1.85	44.2	1.35	8.4
8.....			1.85	44.2	1.35	8.4
9.....			1.80	39.8	1.35	8.4
10.....			1.80	39.8	1.35	8.4
11.....			1.75	35.6	1.40	11.0
12.....			1.75	35.6	1.40	11.0
13.....			1.75	35.6	1.40	11.0
14.....			1.70	31.5	1.40	11.0
15.....			1.70	31.5	1.40	11.0
16.....			1.75	35.6	1.40	11.0
17.....			1.75	35.6	1.40	11.0
18.....	2.05	64.4	1.75	35.6	1.45	13.9
19.....	2.05	64.4	1.75	35.6	1.45	13.9
20.....	2.00	59.2	1.75	35.6	1.45	13.9
21.....	2.00	59.2	1.60	23.9	1.45	13.9
22.....	2.00	59.2	1.60	23.9	1.40	11.0
23.....	2.00	59.2	1.65	27.6	1.40	11.0
24.....	1.95	54.0	1.65	27.6	1.40	11.0
25.....	1.95	54.0	1.60	23.9	1.40	11.0
26.....	1.90	49.0	1.50	17.0	1.40	11.0
27.....	1.90	49.0	1.40	11.0	1.40	11.0
28.....	1.85	44.2	1.35	8.4	1.40	11.0
29.....	1.85	44.2	1.35	8.4	1.40	11.0
30.....	1.85	44.2	1.35	8.4	1.40	11.0
31.....			1.35	8.4		

DAILY GAUGE HEIGHT AND DISCHARGE of Frenchman River, near East End, for 1910.—*Con.*

Day.	July.		August.		September.		October.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	1.40	11.0	1.10	0.5	1.05	0.2	1.14	1.0
2.....	1.40	11.0	1.10	0.5	1.10	0.5	1.14	1.0
3.....	1.40	11.0	1.05	0.2	1.10	0.5	1.14	1.0
4.....	1.40	11.0	1.05	0.2	1.10	0.5	1.14	1.0
5.....	1.40	11.0	1.05	0.2	1.10	0.5	1.14	1.0
6.....	1.40	11.0	1.05	0.2	1.03	0.1	1.14	1.0
7.....	1.30	6.0	1.05	0.2	1.03	0.1	1.14	1.0
8.....	1.30	6.0	1.10	0.5	1.03	0.1	1.14	1.0
9.....	1.15	1.1	1.05	0.2	1.03	0.1	1.14	1.0
10.....	1.15	1.1	1.05	0.2	1.12	0.7	1.14	1.0
11.....	1.15	1.1	1.05	0.2	1.13	0.8	1.14	1.0
12.....	1.25	4.0	1.05	0.2	1.13	0.8	1.11	0.6
13.....	1.25	4.0	1.05	0.2	1.14	1.0	1.11	0.6
14.....	1.10	0.5	1.05	0.2	1.15	1.1	1.11	0.6
15.....	1.10	0.5	1.10	0.5	1.15	1.1	1.10	0.5
16.....	1.10	0.5	1.10	0.5	1.13	0.8	1.10	0.5
17.....	1.10	0.5	1.10	0.5	1.13	0.8	1.10	0.5
18.....	1.15	1.1	1.10	0.5	1.13	0.8	1.13	0.8
19.....	1.15	1.1	1.10	0.5	1.13	0.8	1.13	0.8
20.....	1.20	2.3	1.09	0.4	1.13	0.8	1.15	1.1
21.....	1.20	2.3	1.09	0.4	1.13	0.8	1.15	1.1
22.....	1.20	2.3	1.09	0.4	1.13	0.8	1.12	0.7
23.....	1.30	6.0	1.09	0.4	1.13	0.8	1.12	0.7
24.....	1.30	6.0	1.09	0.4	1.15	1.1	1.10	0.5
25.....	1.30	6.0	1.09	0.4	1.15	1.1	1.10	0.5
26.....	1.30	6.0	1.10	0.5	1.15	1.1	1.10	0.5
27.....	1.30	6.0	1.05	0.2	1.15	1.1	1.10	0.5
28.....	1.30	6.0	1.05	0.2	1.13	0.8	1.10	0.5
29.....	1.30	6.0	1.05	0.2	1.12	0.7	1.10	0.5
30.....	1.15	1.1	1.05	0.2	1.12	0.7	1.10	0.5
31.....	1.10	0.5	1.05	0.2	.....	.....	1.10	0.5

MONTHLY DISCHARGE of Frenchman River, near East End, for 1910.

Drainage area, 635 square miles.

Month.	Discharge in Second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on Drainage area.	Total in acre-feet.
April (18-30).....	64.40	44.20	54.32	0.086	0.041	1,400
May.....	46.40	24.30	39.29	0.062	0.071	2,416
June.....	25.10	13.70	21.34	0.034	0.038	1,270
July.....	13.70	0.80	6.51	0.010	0.012	400
August.....	7.60	0.70	5.06	0.008	0.009	311
September.....	10.00	0.90	6.91	0.011	0.012	411
October.....	12.50	7.30	10.50	0.017	0.020	646
The period.....						6,854

NOTE.—The discharges of Enright & Strong's Ditch have been added to those of Frenchman River.

THE ENRIGHT AND STRONG DITCH, NEAR EAST END.

This station was established July 31, 1909, by F. T. Fletcher. It is located on Sec. 36, Tp. 6, Rge. 22, W. 3rd Mer., at the highway bridge on the Chinook trail, about one mile and a half west of the Enright and Strong ranche, and the same distance upstream from the bridge station on the Frenchman River. The station is about a mile and a half below the Headgate of the ditch and two hundred yards above the diversion gates governing the flow of the branches of the ditch. Hence measurements at the station are affected by changes of slope due to different positions of the headgate for the main ditch and two diversion gates.

The ditch is straight for about 1,000 feet upstream and 600 feet downstream, the south ditch continuing in the same straight course an additional distance of 600 feet before turning southward. The current is, in general, moderately fast, but is affected by the position of the governing gates as noted above.

SESSIONAL PAPER No. 25d

The gauge is a plain staff, graduated to feet and hundredths, attached vertically to the downstream side of the centre of the bridge. Daily observations of gauge height were made during 1910 by D. Savage. The gauge is referred to bench marks as follows:—(1) Nail-heads on the upstream end of the first floor-plank at the right side of the bridge; elevation, 4.93 feet above the datum of the gauge. (2) A square plug driven close to the ground 100 feet south of the bridge and in a line with the upstream hand-rail; elevation, 5.72 feet above the datum of the gauge.

Discharge measurements are made from the upper side of the bridge. The bridge divides the stream into two channels by a central bent. The initial point for soundings is the inner face of the right abutment, marked 0 with white paint.

DISCHARGE MEASUREMENTS of Enright and Strong's Ditch, near East End, in 1910

Date.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Dis-charge.
		<i>Feet.</i>	<i>Sq. ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
April 18.....	H. R. Carscallen..					Nil.
May 11.....	"	10.0	5.28	0.225	0.91	1.19
May 31.....	"	14.2	12.93	1.251	1.52	16.20
June 17.....	R. G. Swan.....	18.8	31.83	0.382	2.64	12.18
July 15.....	"	7.4	3.76	0.436	0.74	1.64
August 3.....	R. J. Burley.....	7.7	3.85	1.196	2.15	4.60
August 4.....	R. G. Swan.....	17.0	24.29	0.223	2.29	5.42
August 6.....	R. J. Burley.....	7.5	4.11	1.693	2.05	6.93
August 10.....	"	13.2	11.72	0.677	1.93	7.93
August 16.....	"	13.0	10.47	0.547	1.75	5.73
August 26.....	R. G. Swan.....	7.5	2.50	0.756	0.45	1.89
September 16.....	"	17.0	22.67	0.371	2.16	8.42
October 12.....	"	15.5	19.15	0.616	1.92	11.85

DAILY GAUGE HEIGHT AND DISCHARGE of Enright and Strong's Ditch, near East End, for 1910.

Day.	April.		May.		June.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....			0.3	0.0	1.60	17.8
2.....			0.3	0.0	1.60	17.8
3.....			0.3	0.0	1.60	17.8
4.....			0.3	0.0	1.55	16.9
5.....			0.3	0.0	1.55	16.9
6.....			0.3	0.0	1.50	15.9
7.....			0.3	0.0	1.45	15.0
8.....			0.3	0.0	1.45	15.0
9.....			0.6	0.1	1.45	15.0
10.....			0.6	0.1	1.45	15.0
11.....			0.9	1.15	1.40	14.1
12.....			0.9	1.15	1.40	14.1
13.....			0.9	1.15	1.40	14.1
14.....			1.2	10.8	1.40	14.1
15.....			1.2	10.8	1.40	14.1
16.....			1.2	10.8	1.40	14.1
17.....			1.2	10.8	2.60	11.5
18.....			1.2	10.8	2.60	11.5
19.....			1.2	10.8	2.55	10.7
20.....			1.2	10.8	2.55	10.7
21.....			1.35	13.3	2.30	7.1
22.....			1.35	13.3	2.20	6.8
23.....	0.8	0.65	1.35	13.3	2.20	6.8
24.....	0.8	0.65	1.50	15.9	2.20	6.8
25.....	0.8	0.65	1.55	16.9	2.10	4.7
26.....	0.4	0.00	1.55	16.9	2.00	3.6
27.....	0.4	0.00	1.50	15.9	1.95	3.1
28.....	0.3	0.00	1.50	15.9	1.90	2.7
29.....	0.3	0.00	1.50	15.9	1.90	2.7
30.....	0.3	0.00	1.50	15.9	1.90	2.7
31.....			1.50	15.9		

DAILY GAUGE HEIGHT AND DISCHARGE of Enright and Strong's Ditch, near East End, for 1910.—*Continued.*

Day.	July.		August.		September.		October.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	1.9	2.70	2.15	3.9	1.35	0.7	2.14	8.1
2.....	1.8	1.90	2.15	3.9	1.60	2.2	2.14	8.1
3.....	1.6	0.70	2.15	3.9	1.60	2.2	2.14	8.1
4.....	1.6	0.70	2.29	5.4	1.60	2.2	2.14	8.1
5.....	1.7	1.20	2.29	5.4	1.60	2.2	2.14	8.1
6.....	1.75	1.50	2.05	6.9	1.63	2.4	2.14	8.1
7.....	0.85	1.60	2.00	6.3	1.63	2.4	2.14	8.1
8.....	0.7	1.35	1.90	7.4	1.65	2.6	2.11	7.8
9.....	0.6	0.85	1.90	7.4	1.65	2.6	2.11	7.8
10.....	0.6	0.85	1.90	7.4	2.11	7.8	2.00	6.3
11.....	0.5	0.40	1.90	7.4	2.11	7.8	2.00	6.3
12.....	0.5	0.40	1.90	7.4	2.12	7.9	1.92	11.8
13.....	0.5	0.40	1.88	7.2	2.13	8.0	1.92	11.8
14.....	0.6	0.85	1.88	7.2	2.17	8.6	1.92	11.8
15.....	0.74	1.60	1.75	5.5	2.17	8.6	1.90	11.4
16.....	1.6	0.30	1.75	5.5	2.16	8.4	1.90	11.4
17.....	1.6	0.30	1.73	5.2	2.16	8.4	1.90	11.4
18.....	1.6	0.30	1.73	5.2	2.17	8.6	1.90	11.4
19.....	1.7	0.70	1.73	5.2	2.03	5.7	1.90	11.4
20.....	1.7	0.70	1.70	4.9	2.03	5.7	1.90	11.4
21.....	1.9	1.75	1.70	4.9	2.05	6.9	1.90	11.4
22.....	1.9	1.75	1.73	5.2	2.07	7.2	1.90	11.4
23.....	1.9	1.75	1.73	5.2	2.07	7.2	1.90	11.4
24.....	2.0	2.50	2.01	3.1	2.13	8.0	1.85	10.6
25.....	2.3	5.55	2.01	3.1	2.13	8.0	1.85	10.6
26.....	2.3	5.55	0.45	1.9	2.15	8.3	1.85	10.6
27.....	2.4	6.80	0.45	1.9	2.19	8.9	1.85	10.6
28.....	2.0	2.50	0.50	1.3	2.19	8.9	1.85	10.6
29.....	2.0	2.50	1.30	0.5	2.19	8.9	1.70	8.4
30.....	2.15	3.90	1.30	0.5	2.19	8.9	1.70	8.4
31.....	2.15	3.90	1.35	0.7	.....	.....	1.70	8.4

MONTHLY DISCHARGE of Enright & Strong's Ditch, near East End, for 1910.

Month.	Discharge in Second-Feet.			Total Discharge acre-feet.
	Maximum.	Minimum.	Mean.	
April (23-30).....	0.65	0.00	0.244	4
May.....	16.90	0.00	8.011	513
June.....	17.80	2.70	11.303	672
July.....	6.80	0.30	1.863	115
August.....	7.40	0.50	4.739	291
September.....	8.90	0.70	6.207	369
October.....	11.80	6.30	9.713	597
The period.....	.....	.....	.....	2,561

NORTH BRANCH OF FRENCHMAN RIVER, AT CROSS' RANCHE.

This station was established July 25, 1908, by F. T. Fletcher. It is located on Sec. 16, Tp. 7, Rge. 22, W. 3rd Mer., about two and one-half miles from East End post office, and about forty-five miles southeast of Maple Creek, by trail.

The channel is straight for about 200 feet above and 600 feet below the station; the current is smooth and fairly swift. Both banks are high and not liable to overflow. The bed of the stream is sandy and may shift at high stages.

Discharge measurements are made at or near the gauge by wading. The initial point for soundings is a square hardwood plug driven into the ground on the right bank of the stream and marked B. M. with white paint.

A plain staff, graduated to feet and hundredths, is placed vertically at the right bank about one mile downstream from the intake of Mr. Frank Cross' irrigation ditch, and one hundred yards below his house. The gauge is read once each day by Mr. Cross. The gauge is referred to bench marks as follows:—(1) A bolt head in the ground log at the southeast corner of Mr. Cross' house; elevation, 11.10 feet above gauge zero. (2) A bolt-head in the initial point stake on the right bank; elevation, 5.45 feet above gauge zero.

Irrigation ditches owned by F. Cross, H. Cross, and W. F. McNicol take their supply from the North Branch of Frenchman River at points above this station. A small quantity of water was diverted during 1910.

DISCHARGE MEASUREMENTS of North Fork of Frenchman River,
at Cross' Ranche, in 1910.

DATE	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Dis-charge.
		<i>Feet.</i>	<i>Sq.-ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
April 18.....	H. R. Carscallen.....	12.8	7.99	1.174	0.82	9.38
May 12.....	".....	12.9	8.53	1.161	0.79	9.90
May 31.....	".....	12.7	7.17	0.946	0.63	6.78
June 17.....	R. G. Swan.....	12.8	7.01	0.807	0.64	5.66
July 16.....	".....	13.8	4.92	0.748	0.54	3.68
August 6.....	".....	12.8	5.84	0.897	0.63	5.24
August 29.....	".....	13.0	6.33	0.790	0.66	5.00
September 10.....	R. J. Burley.....	13.4	6.67	0.945	0.65	6.32
September 17.....	H. R. Carscallen.....	12.6	5.99	0.856	0.61	5.13
October 13.....	R. G. Swan.....	13.0	7.89	0.875	0.67	6.91

DAILY GAUGE HEIGHT AND DISCHARGE of North Fork of Frenchman River,
at Cross' Ranche, for 1910.

DAY.	April.		May.		June.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	0.90	12.0	0.80	9.4	0.60	4.9
2.....	0.90	12.0	0.80	9.4	0.65	5.9
3.....	0.90	12.0	0.80	9.4	0.65	5.9
4.....	0.90	12.0	0.80	9.4	0.70	7.0
5.....	0.90	12.0	0.80	9.4	0.65	5.9
6.....	0.90	12.0	0.80	9.4	0.65	5.9
7.....	0.90	12.0	0.80	9.4	0.60	4.9
8.....	0.90	12.0	0.80	9.4	0.60	4.9
9.....	0.90	12.0	0.80	9.4	0.60	4.9
10.....	0.90	12.0	0.80	9.4	0.60	4.9
11.....	0.90	12.0	0.80	9.4	0.60	4.9
12.....	0.90	12.0	0.80	9.4	0.60	4.9
13.....	0.90	12.0	0.80	9.4	0.60	4.9
14.....	0.90	12.0	0.80	9.4	0.60	4.9
15.....	0.90	12.0	0.80	9.4	0.60	4.9
16.....	0.85	10.7	0.80	9.4	0.60	4.9
17.....	0.85	10.7	0.80	9.4	0.65	5.9
18.....	0.80	9.4	0.80	9.4	0.60	4.9
19.....	0.80	9.4	0.80	9.4	0.60	4.9
20.....	0.80	9.4	0.80	9.4	0.60	4.9
21.....	0.80	9.4	0.80	9.4	0.60	4.9
22.....	0.80	9.4	0.80	9.4	0.60	4.9
23.....	0.80	9.4	0.80	9.4	0.60	4.9
24.....	0.80	9.4	0.80	9.4	0.60	4.9
25.....	0.80	9.4	0.75	8.2	0.60	4.9
26.....	0.80	9.4	0.75	8.2	0.55	3.9
27.....	0.80	9.4	0.70	7.0	0.55	3.9
28.....	0.80	9.4	0.70	7.0	0.50	2.95
29.....	0.80	9.4	0.65	5.9	0.50	2.95
30.....	0.80	9.4	0.65	5.9	0.50	2.95
31.....			0.60	4.9		

DAILY GAUGE HEIGHT AND DISCHARGE of North Fork of Frenchman River,
at Cross' Rancho, for 1910.—*Con.*

DAY.	July.		August.		September.		October.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	0.50	2.95	0.50	2.95	0.65	5.9	0.70	7.0
2.....	0.55	3.90	0.50	2.95	0.65	5.9	0.70	7.0
3.....	0.55	3.90	0.50	2.95	0.65	5.9	0.70	7.0
4.....	0.60	4.90	0.55	3.9	0.70	7.0	0.70	7.0
5.....	0.60	4.90	0.55	3.9	0.70	7.0	0.70	7.0
6.....	0.60	4.90	0.60	4.9	0.70	7.0	0.70	7.0
7.....	0.60	4.90	0.60	4.9	0.70	7.0	0.70	7.0
8.....	0.60	4.90	0.60	4.9	0.70	7.0	0.70	7.0
9.....	0.60	4.90	0.60	4.9	0.70	7.0	0.70	7.0
10.....	0.60	4.90	0.60	4.9	0.65	5.9	0.70	7.0
11.....	0.60	4.90	0.60	4.9	0.65	5.9	0.70	7.0
12.....	0.60	4.90	0.60	4.9	0.65	5.9	0.70	7.0
13.....	0.60	4.90	0.60	4.9	0.65	5.9	0.70	7.0
14.....	0.55	3.90	0.60	4.9	0.65	5.9	0.70	7.0
15.....	0.55	3.90	0.60	4.9	0.65	5.9	0.70	7.0
16.....	0.50	2.95	0.60	4.9	0.65	5.9	0.70	7.0
17.....	0.45	2.15	0.60	4.9	0.60	4.9	0.70	7.0
18.....	0.40	1.50	0.60	4.9	0.60	4.9	0.70	7.0
19.....	0.40	1.50	0.60	4.9	0.60	4.9	0.70	7.0
20.....	0.40	1.50	0.60	4.9	0.65	5.9	0.70	7.0
21.....	0.40	1.50	0.60	4.9	0.65	5.9	0.70	7.0
22.....	0.45	2.15	0.60	4.9	0.65	5.9	0.70	7.0
23.....	0.50	2.95	0.60	4.9	0.65	5.9	0.70	7.0
24.....	0.50	2.95	0.60	4.9	0.65	5.9	0.75	8.2
25.....	0.50	2.95	0.60	4.9	0.70	7.0	0.75	8.2
26.....	0.50	2.95	0.65	5.9	0.70	7.0	0.80	9.4
27.....	0.50	2.95	0.65	5.9	0.70	7.0	0.80	9.4
28.....	0.50	2.95	0.65	5.9	0.70	7.0	0.80	9.4
29.....	0.50	2.95	0.65	5.9	0.70	7.0	0.80	9.4
30.....	0.50	2.95	0.65	5.9	0.70	7.0	0.80	9.4
31.....	0.50	2.95	0.65	5.9	.....	.....	0.80	9.4

MONTHLY DISCHARGE of North Fork of Frenchman River, at Cross' Rancho, for 1910.
Drainage area, 58 square miles.

Month.	Discharge in Second-Feet.				Run-Off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on Drainage area.	Total in acre-feet.
April.....	12.0	9.40	10.79	0.186	0.208	643
May.....	9.4	4.90	8.80	0.152	0.175	541
June.....	7.0	2.95	4.88	0.084	0.094	290
July.....	4.9	1.50	3.46	0.060	0.069	214
August.....	5.9	2.95	4.84	0.084	0.097	298
September.....	7.0	4.90	6.24	0.108	0.121	371
October.....	9.4	7.00	7.54	0.130	0.150	464
The period.....	.....	.....	.....	.....	.....	2,821

FAIRWELL CREEK, AT BOLTON'S RANCHE.

This station was established June 10, 1909, by H. R. Carscallen. It is located about eleven miles southeast of Belanger P. O., at Bolton's rancho, on Sec. 30, Tp. 6, Rge. 24, W. 3rd Mer.

The channel is straight for 75 feet upstream, but curves slightly to the right for 50 feet downstream. Both banks are comparatively low and will overflow at high stages of the stream. The banks are covered with brush above and below the station. The bed of the stream is composed of sand and coarse gravel. The current is sluggish at the station, but is swift a short distance below.

The gauge, which was read daily during the season of 1910, by J. C. Temple, is a rod graduated to feet and hundredths, attached vertically to a post sunk in the bed of the stream at the left bank and securely stayed. The gauge is referred to bench marks as follows:—(1) The head of a spike driven into the pointed top of a willow stump about 50 feet southeast of the gauge, the stump blazed and marked B. M. with red paint; elevation, 6.25 feet above the datum of the

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gauge. (2) The head of a spike surrounded by a circle of nail-heads in a notch cut in a large poplar tree 60 feet southeast of the gauge, the tree blazed and marked B. M. with red paint; elevation, 5.08 feet above the datum of the gauge.

Discharge measurements are made a short distance below the gauge by wading. Owing to the low banks, high-water measurements are not obtainable. The initial point for soundings is a square stake driven close to the ground at the left bank and marked J. P. O. O. Beaver dams below the station have given some trouble.

Within a mile upstream from the gauge rod, the stream is often perfectly dry, while at the rod and a few miles below it, there is a continuous flow. This disappearance of the stream flow, which occurs for a distance of three or four miles, is due to the loose gravelly character of the stream bed.

There are a number of proposed irrigation schemes which will take their supply from this stream at points above the gauging station.

DISCHARGE MEASUREMENTS of Fairwell Creek at Bolton's Ranche, in 1910.

DATE.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Dis-charge.
		<i>Feet.</i>	<i>Sq.-ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
April 19.....	H. R. Carscallen.....	54.0	47.96	0.436	2.14	20.78
May 13.....	".....	52.9	40.51	0.262	1.99	10.63
June 1.....	".....	53.0	46.05	0.200	2.00	9.35
June 18.....	R. G. Swan.....	52.0	38.10	0.168	.....	6.35
July 16.....	".....	52.0	33.66	0.084	1.865	2.84
August 8.....	".....	51.0	33.06	0.082	1.850	2.71
August 29.....	".....	51.0	31.53	0.042	1.820	1.31
September 19.....	".....	52.0	30.54	0.022	1.780	0.67
October 17.....	".....	.....	.....	.....	1.750	0.68

DAILY GAUGE HEIGHT AND DISCHARGE of Fairwell Creek, at Bolton's Ranche, for 1910.

Day.	April.		May.		June.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	.....	.....	2.1	17.0	1.9	4.1
2.....	.....	.....	2.1	17.0	1.9	4.1
3.....	.....	.....	2.1	17.0	1.9	4.1
4.....	.....	.....	2.1	17.0	1.9	4.1
5.....	.....	.....	2.1	17.0	1.9	4.1
6.....	.....	.....	2.1	17.0	1.9	4.1
7.....	.....	.....	2.1	17.0	1.9	4.1
8.....	.....	.....	2.1	17.0	1.9	4.1
9.....	.....	.....	2.1	17.0	1.9	4.1
10.....	.....	.....	2.1	17.0	1.9	4.1
11.....	.....	.....	2.1	17.0	1.9	4.1
12.....	.....	.....	2.1	17.0	1.9	4.1
13.....	.....	.....	2.0	9.2	1.9	4.1
14.....	.....	.....	2.0	9.2	1.9	4.1
15.....	.....	.....	2.0	9.2	1.9	4.1
16.....	.....	.....	2.0	9.2	1.9	4.1
17.....	.....	.....	2.0	9.2	1.9	4.1
18.....	.....	.....	2.1	17.0	1.9	4.1
19.....	2.15	22.0	2.1	17.0	2.0	9.2
20.....	2.15	22.0	2.1	17.0	2.0	9.2
21.....	2.15	22.0	2.1	17.0	2.0	9.2
22.....	2.10	17.0	2.0	9.2	2.0	9.2
23.....	2.10	17.0	2.0	9.2	2.0	9.2
24.....	2.10	17.0	2.0	9.2	1.9	4.1
25.....	2.10	17.0	2.0	9.2	1.9	4.1
26.....	2.10	17.0	2.0	9.2	1.9	4.1
27.....	2.10	17.0	2.0	9.2	1.9	4.1
28.....	2.10	17.0	2.0	9.2	1.9	4.1
29.....	2.10	17.0	2.0	9.2	1.9	4.1
30.....	2.10	17.0	2.0	9.2	1.9	4.1
31.....	.....	.....	1.9	4.1	.....	.....

DAILY GAUGE HEIGHT AND DISCHARGE of Fairwell Creek, at Bolton's Ranche, for 1910.—*Con.*

Day	July		August.		September.		October.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.
1.....	1.9	4.1	1.8	1.3	1.80	1.3	1.77	0.9
2.....	1.9	4.1	1.8	1.3	1.80	1.3	1.78	1.1
3.....	1.9	4.1	1.8	1.3	1.80	1.3	1.78	1.1
4.....	1.9	4.1	1.8	1.3	1.90	4.1	1.78	1.1
5.....	1.9	4.1	2.0	9.2	1.90	4.1	1.78	1.1
6.....	1.9	4.1	1.9	4.1	1.90	4.1	1.78	1.1
7.....	1.9	4.1	1.9	4.1	1.90	4.1	1.79	1.2
8.....	1.9	4.1	1.9	4.1	1.90	4.1	1.79	1.2
9.....	1.9	4.1	1.9	4.1	1.80	1.3	1.78	1.1
10.....	1.9	4.1	1.9	4.1	1.80	1.3	1.78	1.1
11.....	1.9	4.1	1.9	4.1	1.80	1.3	1.78	1.1
12.....	1.9	4.1	1.9	4.1	1.80	1.3	1.78	1.1
13.....	1.9	4.1	1.9	4.1	1.80	1.3	1.77	0.9
14.....	1.9	4.1	1.9	4.1	1.80	1.3	1.77	0.9
15.....	1.9	4.1	1.9	4.1	1.70	0.3	1.77	0.9
16.....	1.9	4.1	1.9	4.1	1.70	0.3	1.76	0.8
17.....	1.8	1.3	1.9	4.1	1.70	0.3	1.76	0.8
18.....	1.8	1.3	1.8	1.3	1.80	1.3	1.76	0.8
19.....	1.8	1.3	1.8	1.3	1.80	1.3	1.76	0.8
20.....	1.8	1.3	1.8	1.3	1.79	1.2	1.76	0.8
21.....	1.8	1.3	1.8	1.3	1.79	1.2	1.76	0.8
22.....	1.8	1.3	1.8	1.3	1.79	1.2	1.76	0.8
23.....	1.8	1.3	1.8	1.3	1.79	1.2	1.77	0.9
24.....	1.8	1.3	1.8	1.3	1.79	1.2	1.77	0.9
25.....	1.8	1.3	1.8	1.3	1.78	1.1	1.77	0.9
26.....	1.8	1.3	1.8	1.3	1.78	1.1	1.77	0.9
27.....	1.8	1.3	1.8	1.3	1.78	1.1	1.77	0.9
28.....	1.8	1.3	1.8	1.3	1.77	0.9	1.77	0.9
29.....	1.8	1.3	1.8	1.3	1.77	0.9	1.77	0.9
30.....	1.8	1.3	1.8	1.3	1.77	0.9	1.77	0.9
31.....	1.8	1.3	1.8	1.3	.....	.....	1.77	0.9

MONTHLY DISCHARGE of Fairwell Creek, at Bolton's Ranche, for 1910.

Drainage area, 135 square miles.

Month.	Discharge in Second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on Drainage area.	Total in acre-feet.
April (19-30).....	22.0	17.0	18.26	0.135	0.060	434
May.....	17.0	4.1	13.03	0.096	0.111	801
June.....	9.2	4.1	4.95	0.037	0.041	295
July.....	4.1	1.3	2.74	0.020	0.023	169
August.....	9.2	1.3	2.64	0.019	0.022	162
September.....	4.1	0.3	1.59	0.012	0.013	95
October.....	1.2	0.8	0.96	0.007	0.008	59

The period..... 2,015

BLACKTAIL CREEK, AT GARISSERE'S RANCHE.

This station was established by H. R. Carscallen on Aug. 3rd, 1909. It is located in S.E. $\frac{1}{4}$ Sec. 31, Tp. 6, Rge. 23, W. 3rd Mer., forty miles southeast of Maple Creek and $\frac{1}{4}$ mile upstream from J. Garissere's house. The channel is straight for 75 feet above and 200 feet below the station. Both banks are high and well wooded. The left bank has a gentle slope but the right is quite steep. The bed of the stream is composed of rocks and gravel, allowing a quantity of water to be lost by seepage. The current is swift.

The gauge rod is of the standard type, securely fastened to a poplar post, sunk in the bed of the stream at the left bank and stayed. The datum elevation of the rod is referred to a Bench Mark formed by two spikes driven into a poplar tree on the right bank, 30 feet upstream and marked B. M. elevation, 7.76 feet and to a second Bench Mark on a spike in a stump on the right bank, 15 feet upstream and marked B. M. elevation, 7.61 feet.

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Discharge measurements are made during high water with a meter, and in low water a weir is used. The initial point of sounding is a stake driven into the left bank and marked I. P. O OO.

Water is diverted for irrigation purposes by J. Garissere at a point about 150 yards below the station. The gauge was read during 1910 by Mrs. Pete Chourrout.

DISCHARGE MEASUREMENTS of Blacktail Creek, at Garissere's Ranche, in 1910.

Date.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Dis-charge.
		<i>Feet.</i>	<i>Sq. ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
April 19.....	H. R. Carscallen	13.5	9.68	0.047	1.33	0.46
May 12.....	"	11.8	7.28	0.032	1.20	0.24
May 31.....	"	10.2	5.98	0.027	1.06	0.16
June 18.....	R. G. Swan.....	9.8	4.52	0.018	0.92	0.09
July 16.....	"					Nil.
August 8.....	"					Nil.
August 29.....	"					Nil.
October 15.....	"				0.85	0.06

Discharges determined by using a 15 inch weir.

DAILY GAUGE HEIGHT AND DISCHARGE of Blacktail Creek, at Garissere's Ranche, for 1910.

Day.	April.		May.		June.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....			1.2	0.28	1.1	0.19
2.....			1.2	0.28	1.1	0.19
3.....			1.2	0.28	1.1	0.19
4.....			1.2	0.28	1.1	0.19
5.....			1.2	0.28	1.1	0.19
6.....			1.2	0.28	1.1	0.19
7.....			1.2	0.28	1.1	0.19
8.....			1.2	0.28	1.1	0.19
9.....			1.2	0.28	1.1	0.19
10.....			1.2	0.28	1.1	0.19
11.....			1.2	0.28	1.1	0.19
12.....			1.2	0.28	1.1	0.19
13.....			1.2	0.28	1.0	0.12
14.....			1.2	0.28	1.0	0.12
15.....			1.2	0.28	1.0	0.12
16.....			1.3	0.41	1.0	0.12
17.....			1.3	0.41	1.0	0.12
18.....			1.3	0.41	0.9	0.07
19.....	1.3	0.41	1.2	0.28	0.9	0.07
20.....	1.3	0.41	1.2	0.28	0.9	0.07
21.....	1.3	0.41	1.2	0.28	0.9	0.07
22.....	1.3	0.41	1.2	0.28	0.9	0.07
23.....	1.3	0.41	1.2	0.28	0.9	0.07
24.....	1.3	0.41	1.2	0.28	0.9	0.07
25.....	1.2	0.28	1.2	0.28	0.9	0.07
26.....	1.2	0.28	1.2	0.28	0.9	0.07
27.....	1.2	0.28	1.3	0.41	0.9	0.07
28.....	1.2	0.28	1.2	0.28	0.9	0.07
29.....	1.2	0.28	1.2	0.28	0.9	0.07
30.....	1.2	0.28	1.1	0.19	0.9	0.07
31.....			1.1	0.19		

DAILY GAUGE HEIGHT AND DISCHARGE of Blacktail Creek, at Garissere's Ranche, for 1910.—*Con.*

Day.	July.		August.		September.		October.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	0.9	0.07	.....	.....	.....	.....	0.5	.....
2.....	0.9	0.07	.....	.....	.....	.....	0.5	.....
3.....	0.9	0.07	.....	.....	.....	.....	0.5	.....
4.....	0.9	0.07	.....	.....	.....	.....	0.5	.....
5.....	0.9	0.07	.....	.....	.....	.....	0.5	.....
6.....	0.9	0.07	.....	.....	.....	.....	0.5	.....
7.....	0.8	0.04	.....	.....	.....	.....	0.5	.....
8.....	0.8	0.04	.....	.....	.....	.....	0.5	.....
9.....	0.8	0.04	.....	.....	.....	.....	0.5	.....
10.....	0.8	0.04	.....	.....	.....	.....	0.6	0.01
11.....	0.8	0.04	.....	.....	.....	.....	0.6	0.01
12.....	0.7	0.02	.....	.....	.....	.....	0.7	0.02
13.....	0.7	0.02	.....	.....	.....	.....	0.7	0.02
14.....	0.7	0.02	.....	.....	.....	.....	0.8	0.04
15.....	0.6	0.01	.....	.....	.....	.....	0.8	0.04
16.....	0.6	0.01	.....	.....	.....	.....	0.8	0.04
17.....	*	.....	.....	.....	.....	.....	0.9	0.07
18.....	.....	.....	.....	.....	.....	.....	0.9	0.07
19.....	.....	.....	.....	.....	.....	.....	0.9	0.07
20.....	.....	.....	.....	.....	.....	.....	0.9	0.07
21.....	.....	.....	.....	.....	0.3	†	0.9	0.07.
22.....	.....	.....	.....	.....	0.3	.....	0.9	0.07
23.....	.....	.....	.....	.....	0.3	.....	0.9	0.07
24.....	.....	.....	.....	.....	0.4	.....	0.9	0.07
25.....	.....	.....	.....	.....	0.4	.....	0.9	0.07
26.....	.....	.....	.....	.....	0.4	.....	0.9	0.07
27.....	.....	.....	.....	.....	0.4	.....	0.9	0.07
28.....	.....	.....	.....	.....	0.4	.....	0.9	0.07
29.....	.....	.....	.....	.....	0.4	.....	0.9	0.07
30.....	.....	.....	.....	.....	0.4	.....	0.9	0.07
31.....	.....	.....	.....	.....	.....	.....	0.9	0.07

* Creek dry, July 17 to September 20.
† No flow, water standing in pools, September 21 to October 9.

MONTHLY DISCHARGE OF BLACKTAIL CREEK, at Garissere's Ranche, for 1910.

Drainage area, 8 square miles.

Month.	Discharge in Second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on Drainage area.	Total in acre-feet.
April (19-30).....	0.41	0.28	0.345	0.043	0.019	8
May.....	0.41	0.19	0.291	0.036	0.041	18
June.....	0.19	0.07	0.126	0.016	0.018	7
July.....	0.07	0.00	0.022	0.002	0.002	1
August.....	.....	.....	.....	.....	.....	.....
September.....	.....	.....	.....	.....	.....	.....
October.....	0.07	0.00	0.039	0.005	0.006	2
The period.....	.....	.....	.....	.....	.....	36

DAVIS CREEK, AT DRURY'S RANCHE.

This station was established May 24, 1909, by H. R. Carscallen. It is located on Sec. 29, T_p. 6, R_{ge}. 25, W. 3rd Mer., about five miles southeast of Belanger P. O., and about one-half mile from the mouth of the creek.

The channel is straight for 150 feet above and 200 feet below the station. The right bank is comparatively high and will not overflow except in cases of extreme flood; the left bank is low and will overflow at high-water stages of the stream. Both banks are covered with brush. The bed of the stream is composed of sand and coarse gravel and there may be a slight sub-surface flow at this point. The current is swift.

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The gauge is a plain staff, graduated to feet and hundredths, attached vertically to a post sunk in the bed of the stream at the right bank and securely stayed to the bank. The gauge is referred to bench marks as follows:—(1) The head of a spike in the top of a pointed willow stump about 15 feet below the gauge on the right bank, the stump blazed and marked B. M. with red paint; elevation, 5.05 feet above gauge zero. (2) The head of a spike surrounded by a circle of nail-heads in the top of a log projecting from southeast corner of Mr. Drury's house; elevation, 9.05 feet above gauge zero. The gauge is read once each day by T. A. Drury.

Discharge measurements are made at or near the gauge by wading. Owing to the left bank being low, high-water measurements are not obtainable. Considerable annoyance is experienced by the construction of dams below the gauge by beavers. During 1910, beaver dams changed the conditions at this station so often that daily discharges could not be computed.

DISCHARGE MEASUREMENTS of Davis Creek, at Drury's Ranche, in 1910.

DATE.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Dis-charge.
		Feet.	Sq. ft.	Ft. per sec.	Feet.	Sec.-ft.
April 20.....	H. R. Carscallen.....	15.0	9.05	1.061	1.13	9.60
June 1.....	".....	13.6	5.04	0.559	0.84	2.82
June 20.....	R. G. Swan.....	12.8	4.22	0.460	0.83	1.94
July 18.....	".....				1.04	.....
August 8.....	".....				1.68	0.28*
August 29.....	".....				1.24	0.13*
September 19.....	".....				0.79	0.01*
October 17.....	".....				1.04	0.026*

* Discharge determined by using a 15 inch weir.

BELANGER CREEK AT GARRISON'S RANCHE.

This station was established June 12, 1909. by H. R. Carscallen. It is located on Sec. 18, Tp. 7, Rge. 25, W. 3rd Mer., one hundred and fifty yards west of Garrison's Ranche (Belanger P. O.), and about twenty-seven miles south of Maple Creek.

The channel is straight for 100 feet above and 125 feet below the station. Both banks are comparatively high but will overflow at times of extreme flood. The ground on the left bank is very rough and broken. Both banks are covered with low underbrush at the station and with large willow brush above and below. The bed of the stream is composed of sand and coarse gravel. The current is moderate at low stages.

The gauge, which is read daily by G. C. Garrison, is a plain staff, graduated to feet and hundredths, attached to a vertical post sunk in the bed of the creek at the left bank and securely stayed to the bank. The gauge is referred to bench marks as follows:—(1) The head of a spike surrounded by a circle of nail-heads in the top of the initial point stake on the left bank, marked B. M. in red paint; elevation, 5.24 feet above the zero of the gauge. (2) The head of a spike driven into the pointed top of a willow stump blazed and marked B.M. in red paint, almost 40 feet north-east of the gauge: Elevation 7.27 ft. above the zero of the gauge.

Discharge measurements are made at the station by wading. No measurements are obtainable at extreme flood stage as the banks overflow and make wading impossible. The initial point for soundings is a square stake driven close to the ground on the left bank and marked I. P. 0. 0.

DISCHARGE MEASUREMENTS of Belanger Creek at Garrison's Ranche, in 1910.

DATE.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Dis-charge.
		Feet.	Sq.-ft.	Ft. per sec.	Feet.	Sec.-ft.
April 20.....	H. R. Carscallen.....	18.7	13.59	0.393	1.49	5.35
May 13.....	".....	18.4	12.73	0.358	1.45	4.60
June 2.....	".....	17.4	12.10	0.347	1.45	4.96
June 20.....	R. G. Swan.....	17.3	11.30	0.279	.....	3.17
July 19.....	".....	17.5	10.38	0.179	1.35	1.86
August 8.....	".....	16.0	10.32	0.166	1.34	1.71
August 20.....	".....	17.5	10.90	0.174	1.31	1.90
September 20.....	".....	16.0	9.54	0.139	1.30	1.33
October 19.....	".....	16.3	8.74	0.116	1.28	1.01

DAILY GAUGE HEIGHT AND DISCHARGE of Belanger Creek, at Garrison's Rancho, for 1910.

DAY.	April.		May.		June.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	1.4	2.8	1.5	5.7	1.5	5.7
2.....	1.4	2.8	1.5	5.7	1.5	5.7
3.....	1.5	5.7	1.5	5.7	1.6	9.2
4.....	1.5	5.7	1.5	5.7	1.55	7.4
5.....	1.5	5.7	1.5	5.7	1.5	5.7
6.....	1.6	9.2	1.5	5.7	1.5	5.7
7.....	1.6	9.2	1.5	5.7	1.5	5.7
8.....	1.6	9.2	1.5	5.7	1.5	5.7
9.....	1.5	5.7	1.5	5.7	1.5	5.7
10.....	1.5	5.7	1.5	5.7	1.5	5.7
11.....	1.5	5.7	1.5	5.7	1.5	5.7
12.....	1.5	5.7	1.5	5.7	1.5	5.7
13.....	1.6	9.2	1.5	5.7	1.5	5.7
14.....	1.6	9.2	1.5	5.7	1.5	5.7
15.....	1.6	9.2	1.5	5.7	1.5	5.7
16.....	1.6	9.2	1.5	5.7	1.5	5.7
17.....	1.5	5.7	1.5	5.7	1.5	5.7
18.....	1.5	5.7	1.5	5.7	1.5	5.7
19.....	1.5	5.7	1.5	5.7	1.5	5.7
20.....	1.5	5.7	1.5	5.7	1.5	5.7
21.....	1.5	5.7	1.5	5.7	1.5	5.7
22.....	1.5	5.7	1.5	5.7	1.5	5.7
23.....	1.5	5.7	1.5	5.7	1.5	5.7
24.....	1.5	5.7	1.5	5.7	1.5	5.7
25.....	1.5	5.7	1.5	5.7	1.5	5.7
26.....	1.5	5.7	1.5	5.7	1.5	5.7
27.....	1.5	5.7	1.5	5.7	1.4	2.8
28.....	1.5	5.7	1.5	5.7	1.4	2.8
29.....	1.5	5.7	1.5	5.7	1.4	2.8
30.....	1.5	5.7	1.5	5.7	1.4	2.8
31.....			1.5	5.7		

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DAILY GAUGE HEIGHT AND DISCHARGE of Belanger Creek, at Garrison's Ranche, for 1910.—*Con.*

DAY.	July.		August.		September.		October.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	1.40	2.80	1.3	1.35	1.3	1.35	1.29	1.27
2.....	1.40	2.80	1.3	1.35	1.3	1.35	1.29	1.27
3.....	1.40	2.80	1.3	1.35	1.3	1.35	1.29	1.27
4.....	1.40	2.80	1.3	1.35	1.3	1.35	1.29	1.27
5.....	1.40	2.80	1.3	1.35	1.3	1.35	1.29	1.27
6.....	1.40	2.80	1.5	5.70	1.3	1.35	1.29	1.27
7.....	1.40	2.80	1.4	2.80	1.3	1.35	1.29	1.27
8.....	1.40	2.80	1.3	1.35	1.3	1.35	1.28	1.19
9.....	1.40	2.80	1.3	1.35	1.3	1.35	1.28	1.19
10.....	1.40	2.80	1.3	1.35	1.3	1.35	1.28	1.19
11.....	1.40	2.80	1.3	1.35	1.3	1.35	1.28	1.19
12.....	1.40	2.80	1.3	1.35	1.3	1.35	1.28	1.19
13.....	1.40	2.80	1.4	2.80	1.3	1.35	1.27	1.11
14.....	1.40	2.80	1.3	1.35	1.3	1.35	1.27	1.11
15.....	1.40	2.80	1.3	1.35	1.3	1.35	1.27	1.11
16.....	1.40	2.80	1.3	1.35	1.3	1.35	1.27	1.11
17.....	1.35	1.85	1.3	1.35	1.3	1.35	1.27	1.11
18.....	1.35	1.85	1.3	1.35	1.3	1.35	1.27	1.11
19.....	1.35	1.85	1.3	1.35	1.3	1.35	1.27	1.11
20.....	1.35	1.85	1.3	1.35	1.3	1.35	1.27	1.11
21.....	1.35	1.85	1.3	1.35	1.3	1.35	1.27	1.11
22.....	1.30	1.35	1.3	1.35	1.3	1.35	1.27	1.11
23.....	1.30	1.35	1.3	1.35	1.3	1.35	1.27	1.11
24.....	1.30	1.35	1.3	1.35	1.3	1.35	1.27	1.11
25.....	1.30	1.35	1.3	1.35	1.3	1.35	1.27	1.11
26.....	1.30	1.35	1.3	1.35	1.3	1.35	1.27	1.11
27.....	1.30	1.35	1.3	1.35	1.3	1.35	1.27	1.11
28.....	1.30	1.35	1.3	1.35	1.3	1.35	1.27	1.11
29.....	1.30	1.35	1.3	1.35	1.3	1.35	1.27	1.11
30.....	1.30	1.35	1.3	1.35	1.3	1.35	1.27	1.11
31.....	1.30	1.35	1.3	1.35	.....	.....	1.27	1.11

MONTHLY DISCHARGE of Belanger Creek, at Garrison's Ranche, for 1910.

Drainage area, 47 square miles.

Month.	Discharge in Second-Feet.				Run-Off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on Drainage area.	Total in acre-feet.
April.....	9.20	2.80	6.32	0.134	0.150	376
May.....	5.70	5.70	5.70	0.121	0.140	350
June.....	9.20	2.80	5.49	0.117	0.130	327
July.....	2.85	1.35	2.18	0.046	0.053	134
August.....	5.70	1.35	1.91	0.040	0.046	117
September.....	1.35	1.35	1.35	0.029	0.032	80
October.....	1.27	1.11	1.16	0.025	0.029	71
The period.....						1,455

LONEPINE CREEK AT HEWITT'S RANCHE.

This station was established July 17, 1909, by H. R. Carscallen. It is located on Sec. 27, Tp. 7, Rge. 26, W. 3rd Mer., about two miles west of the surveyed trail from Belanger P. O., to Maple Creek and about four miles west of Belanger P. O.

The channel is straight for 35 feet above and 45 feet below the station. The right bank is high and not liable to overflow: the left bank is comparatively low and will overflow at high stages of the stream. The surface of the ground on the left bank is very rough and broken. The bed of the stream is composed of sand and coarse gravel. The current is smooth and swift.

The gauge, which is read daily by S. W. Hewitt, is a rod, graduated to feet and hundredths, attached to a vertical post sunk in the bed of the stream at the right bank and securely stayed to the bank. The gauge is referred to bench marks as follows:—(1) A spike-head in the top of the final stake driven close to the ground on the right bank, marked B. M. in red paint; elevation, 5.63 feet above gauge zero. (2) The head of a spike in the top of a pointed willow stump blazed and marked B. M., on the left bank, 97 feet north of the gauge; elevation, 4.59 feet above the zero of the gauge.

The discharge measurements are made near the gauge by wading and at very low stages a weir is used. The initial point for soundings is a square stake driven close to the ground on the left bank and marked I. P. o.o. The station is below ditches constructed by A. P. McDonald and S. W. Hewitt, and in the case of water being used in these ditches the records at the gauge would not give the total discharge of the creek.

DISCHARGE MEASUREMENTS of Lonepine Creek at Hewitt's Ranche, in 1910.

DATE.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Dis-charge.
		Feet.	Sq.-ft.	Ft. per sec.	Feet.	Sec.-ft.
April 20.....	H. R. Carscallen.....	4.4	2.28	0.754	1.35	1.72
May 13.....	".....	4.4	1.92	0.640	1.29	1.23
June 2.....	".....	4.1	1.32	0.387	1.05	0.51
July 19.....	R. G. Swan.....	3.5	0.89	0.381	1.03	0.34
August 30.....	".....	2.5	0.76	0.605	1.16	0.46
September 20.....	".....	2.6	0.98	0.459	1.18	0.45
October 19.....	".....	3.5	1.42	0.751	1.28	1.07

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DAILY GAUGE HEIGHT AND DISCHARGE of Lonepine Creek at Hewitt's Rancho, for 1910.

DAY.	April.		May.		June.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	1.30	1.30	1.30	1.30	0.95	0.24
2.....	1.30	1.30	1.30	1.30	1.05	0.37
3.....	1.30	1.30	1.30	1.30	1.45	2.80
4.....	1.30	1.30	1.30	1.30	1.45	2.80
5.....	1.30	1.30	1.30	1.30	1.45	2.80
6.....	1.30	1.30	1.25	1.00	1.30	1.30
7.....	1.30	1.30	1.25	1.00	1.35	1.72
8.....	1.35	1.72	1.25	1.00	1.35	1.72
9.....	1.40	2.24	1.25	1.00	1.35	1.72
10.....	1.40	2.24	1.25	1.00	*0.95	0.24
11.....	1.40	2.24	1.30	1.30	*1.15	0.59
12.....	1.35	1.72	1.30	1.30	*1.15	0.59
13.....	1.45	2.80	1.28	1.18	*0.95	0.24
14.....	1.45	2.80	1.25	1.00	*0.95	0.24
15.....	1.35	1.72	1.45	2.80	*0.95	0.24
16.....	1.35	1.72	1.45	2.80	*0.95	0.24
17.....	1.35	1.72	1.40	2.24	1.05	0.37
18.....	1.35	1.72	1.40	2.24	1.05	0.37
19.....	1.35	1.72	1.40	2.24	1.05	0.37
20.....	1.35	1.72	1.40	2.24	1.05	0.37
21.....	1.35	1.72	1.30	1.30	1.05	0.37
22.....	1.35	1.72	1.30	1.30	1.05	0.37
23.....	1.35	1.72	1.30	1.30	1.05	0.37
24.....	1.30	1.30	1.25	1.00	1.05	0.37
25.....	1.30	1.30	*0.95	0.24	1.05	0.37
26.....	1.30	1.30	*0.95	0.24	1.05	0.37
27.....	1.30	1.30	*0.95	0.24	*0.95	0.24
28.....	1.30	1.30	1.05	0.37	*0.95	0.24
29.....	1.30	1.30	1.05	0.37	1.00	0.30
30.....	1.30	1.30	0.95	0.24	1.05	0.37
31.....			0.95	0.24		

* Water being used for irrigation above gauge rod.

DAILY GAUGE HEIGHT AND DISCHARGE of Lonepine Creek at Hewitt's Ranche, for 1910.—*Con.*

DAY.	July.		August.		September.		October.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis. charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	1.10	0.46	1.15	0.59	1.15	0.59	1.19	0.73
2.....	1.05	0.37	1.15	0.59	1.15	0.59	1.19	0.73
3.....	1.05	0.37	1.05	0.37	1.15	0.59	1.19	0.73
4.....	1.05	0.37	1.05	0.37	1.35	1.72	1.20	0.77
5.....	1.05	0.37	1.15	0.59	1.35	1.72	1.20	0.77
6.....	1.05	0.37	1.15	0.59	1.35	1.72	1.20	0.77
7.....	1.05	0.37	1.15	0.59	1.35	1.72	1.20	0.77
8.....	1.05	0.37	1.15	0.59	1.25	1.00	1.20	0.77
9.....	1.05	0.37	1.15	0.59	1.25	1.00	1.20	0.77
10.....	1.05	0.37	1.15	0.59	1.25	1.00	1.20	0.77
11.....	1.05	0.37	1.15	0.59	1.25	1.00	1.20	0.77
12.....	1.05	0.37	1.15	0.59	1.25	1.00	1.20	0.77
13.....	1.05	0.37	1.15	0.59	1.25	1.00	1.20	0.77
14.....	1.05	0.37	1.15	0.59	1.25	1.00	1.20	0.77
15.....	1.05	0.37	1.15	0.59	1.25	1.00	1.20	0.77
16.....	1.05	0.37	1.15	0.59	1.15	0.59	1.20	0.77
17.....	1.05	0.37	1.15	0.59	1.15	0.59	1.20	0.77
18.....	1.05	0.37	1.15	0.59	1.15	0.59	1.30	1.30
19.....	1.05	0.37	1.15	0.59	1.15	0.59	1.27	1.12
20.....	1.05	0.37	1.15	0.59	1.18	0.70	1.27	1.12
21.....	1.05	0.37	1.15	0.59	1.19	0.73	1.27	1.12
22.....	1.05	0.37	1.15	0.59	1.18	0.70	1.25	1.00
23.....	1.15	0.59	1.15	0.59	1.18	0.70	1.24	0.95
24.....	1.15	0.59	1.15	0.59	1.19	0.73	1.23	0.91
25.....	1.15	0.59	1.15	0.59	1.19	0.73	1.24	0.95
26.....	1.15	0.59	1.15	0.59	1.19	0.73	1.24	0.95
27.....	1.15	0.59	1.15	0.59	1.19	0.73	1.24	0.95
28.....	1.15	0.59	1.15	0.59	1.19	0.73	1.25	1.00
29.....	1.15	0.59	1.15	0.59	1.19	0.73	1.25	1.00
30.....	1.15	0.59	1.15	0.59	1.19	0.73	1.24	0.95
31.....	1.15	0.59	1.15	0.59	.....	.....	1.24	0.95

MONTHLY DISCHARGE of Lonepine Creek at Hewitt's Ranche, for 1910.

Drainage area, 4 square miles.

Month.	Discharge in Second-Feet.				Run-Off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth, in inches on Drainage area.	Total in acre-feet.
April.....	2.80	1.30	1.65	0.412	0.460	98
May.....	2.80	0.24	1.22	0.304	0.351	75
June.....	2.80	0.24	0.743	0.185	0.206	44
July.....	0.59	0.37	0.404	0.101	0.116	25
August.....	0.59	0.37	0.576	0.144	0.166	35
September.....	1.72	0.59	0.898	0.224	0.258	53
October.....	1.30	0.73	0.878	0.220	0.254	60
The period.....						390

SUCKER CREEK AT WITCOMB AND ZEIGLER'S RANCHE.

This station was established May 26, 1909, by H. R. Carscallen. It is located on the north boundary of Sec. 24, Tp. 6, Rge. 26, W. 3rd Mer., about five miles south of Belanger Post Office and about thirty-two miles south of Maple Creek.

The channel is straight for 25 feet above and 45 feet below the station. The right bank is comparatively low and will overflow at high stages; the left bank is high and not liable to overflow. The right bank is sparsely covered with brush; the left bank is free from brush at the station. The bed of the stream is composed of sand and coarse gravel. The current is sluggish at the station but swift immediately below.

The gauge, which is read once each day by Mrs. P. A. Zeigler, is a plain staff, graduated to feet and hundredths attached to a vertical post sunk in the bed of the stream at the left bank and securely stayed to the bank. The gauge is referred to bench marks as follows:—(1) A circle of nail-heads in a log near the ground at the northeast corner of a stable; elevation, 12.27 feet above the zero of the gauge. (2) A spike-head in the top of the initial point stake on the left bank, marked B. M.; elevation, 5.30 feet above the zero of the gauge.

Discharge measurements are made at or near the gauge by wading and at very low stages a weir is used. High water measurements cannot be made as the right bank overflows. The initial point for soundings is a square stake driven close to the ground on the left bank and marked I. P. o.o.

DISCHARGE MEASUREMENTS of Sucker Creek at Witcomb and Zeigler's Ranche, in 1910.

DATE	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Dis-charge.
		Feet.	Sq.-ft.	Ft. per sec.	Feet.	Sec.-ft.
April 20.....	H. R. Carscallen.....	12.0	6.05	0.692	0.72	4.19
May 13.....	".....	10.7	4.40	0.700	0.64	3.04
June 2.....	".....	9.2	3.72	0.632	0.59	2.35
June 20.....	R. G. Swan.....	10.5	4.61	0.254	0.51	1.17
July 18.....	".....	7.0	1.61	0.143	0.36	0.23
August 8.....	".....	8.9	3.22	0.521	0.55	1.68
August 29.....	".....	7.0	2.52	0.698	0.54	1.76
September 20.....	".....	7.1	2.48	0.694	0.57	1.72
October 17.....	".....	7.0	3.06	0.716	0.60	2.19

DAILY GAUGE HEIGHT AND DISCHARGE of Sucker Creek at Witcomb & Zeigler's Ranche, for 1910

DAY.	April.		May.		June.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	0.90	7.25	0.65	3.00	0.58	2.06
2.....	0.90	7.25	0.65	3.00	0.60	2.30
3.....	0.85	6.35	0.65	3.00	0.62	2.58
4.....	0.85	6.35	0.64	2.86	0.61	2.44
5.....	0.80	5.45	0.63	2.72	0.60	2.30
6.....	0.90	7.25	0.62	2.58	0.58	2.06
7.....	0.85	6.35	0.61	2.44	0.58	2.06
8.....	0.85	6.35	0.60	2.30	0.57	1.94
9.....	0.90	7.25	0.60	2.30	0.57	1.94
10.....	0.90	7.25	0.60	2.30	0.55	1.70
11.....	0.87	6.71	0.60	2.30	0.53	1.48
12.....	0.85	6.35	0.65	3.00	0.52	1.37
13.....	0.90	7.25	0.64	2.86	0.52	1.37
14.....	0.85	6.35	0.62	2.58	0.51	1.26
15.....	0.83	5.99	0.70	3.80	0.51	1.26
16.....	0.80	5.45	0.65	3.00	0.50	1.15
17.....	0.75	4.60	0.62	2.58	0.55	1.70
18.....	0.74	4.44	0.62	2.58	0.50	1.15
19.....	0.73	4.28	0.61	2.44	0.50	1.15
20.....	0.72	4.12	0.61	2.44	0.45	0.70
21.....	0.70	3.80	0.61	2.44	0.48	0.97
22.....	0.70	3.80	0.60	2.30	0.50	1.15
23.....	0.69	3.64	0.60	2.30	0.52	1.37
24.....	0.67	3.32	0.60	2.30	0.50	1.15
25.....	0.65	3.00	0.60	2.30	0.45	0.70
26.....	0.65	3.00	0.59	2.18	0.42	0.52
27.....	0.65	3.00	0.59	2.18	0.41	0.46
28.....	0.65	3.00	0.59	2.18	0.40	0.40
29.....	0.65	3.00	0.59	2.18	0.40	0.40
30.....	0.65	3.00	0.58	2.06	0.55	1.70
31.....			0.58	2.06		

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DAILY GAUGE HEIGHT AND DISCHARGE of Sucker Creek at Witcomb & Zeigler's Ranche, for 1910.
Concluded.

DAY.	July		August.		September.		October.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	0.51	1.26	0.40	0.40	0.59	2.18	0.57	1.94
2.....	0.50	1.15	0.40	0.40	0.56	1.82	0.57	1.94
3.....	0.48	0.97	0.40	0.40	0.55	1.70	0.57	1.94
4.....	0.55	1.70	0.40	0.40	0.60	2.30	0.59	2.18
5.....	0.50	1.15	0.80	5.45	0.62	2.58	0.60	2.30
6.....	0.45	0.70	0.60	2.30	0.60	2.30	0.60	2.30
7.....	0.48	0.97	0.55	1.70	0.63	2.72	0.60	2.30
8.....	0.47	0.88	0.53	1.48	0.62	2.58	0.60	2.30
9.....	0.50	1.15	0.51	1.26	0.60	2.30	0.60	2.30
10.....	0.50	1.15	0.50	1.15	0.60	2.30	0.60	2.30
11.....	0.50	1.15	0.49	1.06	0.58	2.06	0.60	2.30
12.....	0.45	0.70	0.49	1.06	0.56	1.82	0.60	2.30
13.....	0.43	0.58	0.65	3.00	0.56	1.82	0.60	2.30
14.....	0.40	0.40	0.60	2.30	0.55	1.70	0.60	2.30
15.....	0.35	0.20	0.59	2.18	0.55	1.70	0.60	2.30
16.....	0.35	0.20	0.57	1.94	0.55	1.70	0.60	2.30
17.....	0.35	0.20	0.55	1.70	0.55	1.70	0.59	2.18
18.....	0.33	0.10	0.53	1.48	0.55	1.70	0.59	2.18
19.....	0.33	0.10	0.52	1.37	0.55	1.70	0.59	2.18
20.....	0.33	0.10	0.51	1.26	0.55	1.70	0.60	2.30
21.....	0.35	0.20	0.51	1.26	0.55	1.70	0.61	2.44
22.....	0.45	0.70	0.52	1.37	0.60	2.30	0.61	2.44
23.....	0.55	1.70	0.55	1.70	0.60	2.30	0.60	2.30
24.....	0.50	1.15	0.57	1.94	0.60	2.30	0.60	2.30
25.....	0.45	0.70	0.55	1.70	0.60	2.30	0.60	2.30
26.....	0.45	0.70	0.52	1.37	0.60	2.30	0.60	2.30
27.....	0.45	0.70	0.52	1.37	0.60	2.30	0.60	2.30
28.....	0.43	0.58	0.52	1.37	0.60	2.30	0.60	2.30
29.....	0.43	0.58	0.54	1.59	0.59	2.18	0.60	2.30
30.....	0.40	0.40	0.53	1.48	0.58	2.06	0.60	2.30
31.....	0.40	0.40	0.53	1.48	.....	.....	0.60	2.30

MONTHLY DISCHARGE of Sucker Creek at Witcomb & Zeigler's Ranche, for 1910.

Drainage area, 36 square miles.

Month.	Discharge in Second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on Drainage area.	Total in acre-feet.
April.....	7.25	3.00	5.173	0.144	0.161	308
May.....	3.80	2.06	2.534	0.070	0.081	156
June.....	2.58	0.40	1.426	0.040	0.044	85
July.....	1.70	0.10	0.730	0.020	0.023	45
August.....	5.45	0.40	1.578	0.044	0.051	97
September.....	2.72	1.70	2.081	0.058	0.065	124
October.....	2.44	1.94	2.259	0.063	0.073	139
The period.....						954

OXARART CREEK AT WYLIE'S RANCHE.

This station was established June 15, 1909, by H. R. Carscallen. It is located on Sec. 20, Tp. 6, Rge. 27, W. 3rd Mer., near the mouth of the creek and about thirty-five miles south of Maple Creek.

The channel is straight for 10 feet upstream and then divides into four small courses; the channel is straight for about 20 feet downstream then strikes an earth dam used in diverting water into Mr. Joseph Wylie's irrigation ditch. Here it makes a right-angled turn to the left, a small amount seeping through the dam and flowing down the natural course of the stream. The stream has a considerable fall and is subject to sudden and extreme floods, necessitating the replacing of the dam below the station after every flood. This brings the records of gauge height observations under new sets of conditions and a different rating curve must be constructed for each change of conditions. The creek has several channels during high stages and the station, although unsatisfactory, is the only section to be found, within reach of an observer, where the total flow is contained in one channel during the low water period. The bed of the stream is composed of sand and coarse gravel. The current is sluggish at the station during low water.

The gauge, which is read once each day by Mrs. Rachel Wylie, is a plain staff, graduated to feet and hundredths, attached to a vertical post sunk in the bed of the stream at the left bank and securely stayed to the bank. The gauge is referred to bench marks as follows:—(1) A spike-head in the top of the final point stake driven close to the ground on the right bank, marked B. M.; elevation, 4.71 feet above the zero of the gauge. (2) The top of three nails driven horizontally into a large willow tree, blazed and marked B. M., and about 20 feet from the gauge; elevation, 4.45 feet above the zero of the gauge.

Discharge measurements are made a short distance above the station by wading. The initial point for soundings is a square stake driven close to the ground on the left bank and marked I. P. o.o.

DISCHARGE MEASUREMENTS of Oxarart Creek at Wylie's Ranche, in 1910.

Date.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Dis-charge.
		<i>Feet.</i>	<i>Sq. ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
April 21.....	H. R. Carscallen.....	22.8	16.41	0.147	0.97	2.44
May 14.....	".....	23.3	15.03	0.144	0.96	2.17
June 9.....	".....	22.3	14.23	0.106	0.89	1.51
June 30.....	".....	21.8	12.11	0.082	0.85	0.99
July 22.....	".....	22.2	12.45	0.057	0.84	0.71
August 9.....	".....	21.7	11.61	0.058	0.79	0.67
September 2.....	".....	22.0	11.93	0.054	0.79	0.65
September 26.....	R. G. Swan.....	21.0	11.18	0.047	0.80	0.54
October 20.....	".....	21.7	10.85	0.043	0.78	0.47

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DAILY GAUGE HEIGHT AND DISCHARGE of Oxarart Creek, at Wylie's Rancho, for 1910.

Day.	April.		May.		June.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.
1.....	1.4	12.0	1.0	2.8	0.9	1.5
2.....	1.4	12.0	1.0	2.8	0.9	1.5
3.....	1.4	12.0	1.0	2.8	0.9	1.5
4.....	1.4	12.0	1.0	2.8	0.9	1.5
5.....	1.4	12.0	1.0	2.8	0.9	1.5
6.....	1.3	9.3	1.0	2.8	0.9	1.5
7.....	1.3	9.3	1.0	2.8	0.9	1.5
8.....	1.3	9.3	1.0	2.8	0.9	1.5
9.....	1.3	9.3	1.0	2.8	0.9	1.5
10.....	1.2	6.8	1.0	2.8	0.9	1.5
11.....	1.1	4.6	1.0	2.8	0.9	1.5
12.....	1.1	4.6	1.0	2.8	0.9	1.5
13.....	1.0	2.8	1.0	2.8	0.9	1.5
14.....	1.0	2.8	1.0	2.8	0.9	1.5
15.....	1.0	2.8	1.0	2.8	0.9	1.5
16.....	1.0	2.8	1.0	2.8	0.9	1.5
17.....	1.0	2.8	1.0	2.8	0.9	1.5
18.....	1.0	2.8	1.0	2.8	0.9	1.5
19.....	1.0	2.8	1.0	2.8	0.9	1.5
20.....	1.0	2.8	1.0	2.8	0.9	1.5
21.....	1.0	2.8	1.0	2.8	0.9	1.5
22.....	1.0	2.8	1.0	2.8	0.9	1.5
23.....	1.0	2.8	1.0	2.8	0.9	1.5
24.....	1.0	2.8	1.0	2.8	0.9	1.5
25.....	1.0	2.8	0.9	1.5	0.9	1.5
26.....	1.0	2.8	0.9	1.5	0.9	1.5
27.....	1.0	2.8	0.9	1.5	0.9	1.5
28.....	1.0	2.8	0.9	1.5	0.9	1.5
29.....	1.0	2.8	0.9	1.5	0.9	1.5
30.....	1.0	2.8	0.9	1.5	0.9	1.5
31.....			0.9	1.5		

DAILY GAUGE HEIGHT AND DISCHARGE of Oxarart Creek at Wylie's Ranche, for 1910.—*Con.*

Day.	July.		August.		September.		October.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	0.9	1.50	0.80	0.65	0.81	0.72	0.8	0.65
2.....	0.9	1.50	0.80	0.65	0.81	0.72	0.8	0.65
3.....	0.9	1.50	0.80	0.65	0.81	0.72	0.8	0.65
4.....	0.9	1.50	0.80	0.65	0.81	0.72	0.8	0.65
5.....	0.9	1.50	0.82	0.79	0.81	0.72	0.8	0.65
6.....	0.9	1.50	0.82	0.79	0.81	0.72	0.8	0.65
7.....	0.9	1.50	0.82	0.79	0.81	0.72	0.8	0.65
8.....	0.8	0.65	0.81	0.72	0.81	0.72	0.8	0.65
8.....	0.8	0.65	0.80	0.65	0.81	0.72	0.8	0.65
10.....	0.8	0.65	0.80	0.65	0.81	0.72	0.8	0.65
11.....	0.8	0.65	0.80	0.65	0.81	0.72	0.8	0.65
12.....	0.8	0.65	0.81	0.72	0.81	0.72	0.8	0.65
13.....	0.8	0.65	0.81	0.72	0.81	0.72	0.8	0.65
14.....	0.8	0.65	0.81	0.72	0.81	0.72	0.8	0.65
15.....	0.8	0.65	0.81	0.72	0.81	0.72	0.8	0.65
16.....	0.8	0.65	0.81	0.72	0.81	0.72	0.8	0.65
17.....	0.8	0.65	0.81	0.72	0.81	0.72	0.8	0.65
18.....	0.8	0.65	0.81	0.72	0.81	0.72	0.8	0.65
19.....	0.8	0.65	0.81	0.72	0.81	0.72	0.8	0.65
20.....	0.8	0.65	0.81	0.72	0.81	0.72	0.8	0.65
21.....	0.8	0.65	0.81	0.72	0.81	0.72	0.8	0.65
22.....	0.8	0.65	0.81	0.72	0.81	0.72	0.8	0.65
23.....	0.8	0.65	0.81	0.72	0.80	0.65	0.8	0.65
24.....	0.8	0.65	0.81	0.72	0.80	0.65	0.8	0.65
25.....	0.8	0.65	0.81	0.72	0.80	0.65	0.8	0.65
26.....	0.8	0.65	0.81	0.72	0.80	0.65	0.8	0.65
27.....	0.8	0.65	0.81	0.72	0.80	0.65	0.8	0.65
28.....	0.8	0.65	0.81	0.72	0.80	0.65	0.8	0.65
29.....	0.8	0.65	0.81	0.72	0.80	0.65	0.8	0.65
30.....	0.8	0.65	0.81	0.72	0.80	0.65	0.8	0.65
31.....	0.8	0.65	0.81	0.72	.....	.....	0.8	0.65

SESSIONAL PAPER No. 25d

MONTHLY DISCHARGE of Oxarart Creek at Wylie's Ranche, for 1910.

Drainage area, 73 square miles.

Month.	Discharge in Second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on Drainage area.	Total in acre-feet.
April.....	12.00	2.80	5.450	0.074	0.083	324
May.....	2.80	1.50	2.510	0.034	0.039	154
June.....	1.50	1.50	1.500	0.021	0.023	89
July.....	1.50	0.65	0.841	0.012	0.014	52
August.....	0.79	0.65	0.710	0.010	0.012	44
September.....	0.72	0.65	0.700	0.010	0.011	42
October.....	0.65	0.65	0.680	0.009	0.010	40
The period.....						745

MISCELLANEOUS DISCHARGE MEASUREMENTS of Frenchman River Drainage Basin, in 1910.

Date.	Stream.	Locality.	Hydrographer.	Width.	Area of Section.	Dis-charge.
				Feet.	Sq. ft.	Sec.-ft.
June 7.....	Creek (Spring).....	20-6-27-3.....	F. T. Fletcher.....	*.....	.....	0.18
May 25.....	Frenchman River....	S.E. 5-1-10-3.....	F. H. Peters.....	31.00	26.25	42.48
August 2.....	".....	N.E. 20-6-22-3.....	R. J. Burley.....	14.5	5.31	4.21
August 3.....	".....	".....	".....	16.4	6.80	2.50
August 6.....	".....	".....	".....	17.4	7.77	5.13
August 10.....	".....	".....	".....	15.5	7.84	8.08
August 3.....	".....	S.E. 28-6-21-3.....	".....	4.5	1.21	0.40
August 6.....	".....	".....	".....	5.0	1.37	0.60
August 8.....	".....	".....	".....	5.1	1.38	0.54
August 11.....	".....	".....	".....	5.1	1.20	0.50
August 16.....	".....	".....	".....	7.3	2.28	1.17
July 14.....	Morrison Bros.' Ditch	S.W. 26-6-21-3.....	R. G. Swan.....	6.6	1.56	0.66
June 29.....	War Lodge Creek....	14-7-27-3.....	H. R. Carscallen.....	*.....	.....	0.10

* Weir measurement.

SWIFTCURRENT CREEK DRAINAGE BASIN.

General Description.

Swiftcurrent Creek rises in the eastern slope of the Cypress Hills and follows a northeasterly course for 75 miles and then northward for about 25 miles and finally empties into the South Saskatchewan River in Tp. 20, Rge. 13, W. 3rd Mer.

The only important tributary is Bone Creek, which rises in the Cypress Hills and joins the Swiftcurrent in Tp. 10, Rge. 19, W. 3rd Mer.

The main stream flows through a valley, two to three hundred feet deep and a mile wide, to within a few miles of its mouth, where it enters a deep sandstone gorge, about five hundred feet deep.

The bench land above the creek is of rolling prairie broken by innumerable coulees. The soil is a sandy loam. There is very little tree growth along the stream.

The mean annual rainfall at the town of Swiftcurrent is about 15 inches. This increases slightly at the stream's headwaters. The greatest precipitation occurs during the months of May, June and July. From November to April the stream is frozen over.

There are a number of small irrigation ditches in this drainage basin, and the town of Swiftcurrent takes water for domestic and industrial purposes from the creek.

SWIFTCURRENT CREEK AT POLLOCK'S RANCHE.

This station was established May 18, 1909, by H. R. Carscallen. It is located on Sec. 22, Tp. 7, Rge. 21, W. 3rd Mer., about 4 miles southwest of Southfork P. O.

The channel is straight for 50 feet above and 15 feet below the station. Both banks are high and not liable to overflow. The bed of the stream is composed of sand and gravel. The current is moderate at ordinary stages, becoming sluggish at very low stages of the stream.

The gauge, which is read daily by D. Pollock, is a plain staff, graduated to feet and hundredths, attached to a vertical post sunk in the bed of the stream at the right bank and firmly stayed. It is referred to bench marks as follows:—(1) The top of a hardwood plug driven close to the ground on the left bank beside the corner post of Mr. Pollock's fence, the post blazed and marked B. M.; elevation, 10.16 feet above the zero of the gauge. (2) A hardwood plug driven close to the ground beside a post in the line of fence running east from the corner post and about 100 feet from it, the post blazed and marked B. M.; elevation, 9.24 feet above the zero of the gauge. (3) The top of the ground log at the southeast corner of Mr. Pollock's house, marked with three nail-heads; elevation, 21.28 feet above the zero of the gauge.

Discharge measurements are made at or near the gauge by wading at ordinary stages and at very low stages a weir is used. Mr. Pollock diverts water from the creek into an irrigation ditch about one-half mile above the gauge and when he is using water in his ditch the gauge does not record the total flow of the creek.

DISCHARGE MEASUREMENTS of Swiftcurrent Creek at Pollock's Ranche, in 1910.

Date.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Dis-charge.
		<i>Feet.</i>	<i>Sq. ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
April 15.....	H. R. Carscallen.....	4.5	2.44	0.814	0.94	1.97
May 9.....	".....	4.2	1.22	0.548	0.71	0.67*
May 30.....	".....				0.73	0.68*
June 16.....	R. G. Swan.....	3.9	1.19	0.386	0.71	0.46*
July 9.....	".....	4.3	1.31	0.309	0.77	0.41*
August 3.....	".....	4.5	1.77	0.429	0.86	0.76
August 8.....	R. J. Burley.....				0.90	0.98*
August 10.....	".....				0.86	0.86*
August 11.....	".....				0.83	0.84*
August 13.....	".....				0.93	1.17*
August 16.....	".....				0.86	0.88*
August 26.....	R. G. Swan.....				0.82	0.92*
September 16.....	".....	4.0	1.31	0.700	0.79	0.92*
October 12.....	".....	3.8	1.52	0.815	0.83	1.24
November 8.....	".....				0.92	1.83

* Discharge determined by using a 15 inch weir.



Steam Shovel on Southern Alberta Land Co's Canal, near Gleichen, Alta.



Steam Shovel on Southern Alberta Land Co's Canal, near Gleichen, Alta.

SESSIONAL PAPER No. 25d

DAILY GAUGE HEIGHT AND DISCHARGE of Swiftcurrent Creek at Pollock's Rancho, for 1910.

DAY.	April.		May.		June.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet,</i>	<i>Sec.-ft.</i>
1.....	1.10	3.20	0.75	0.75	0.85	1.35
2.....	1.10	3.20	0.75	0.75	0.90	1.70
3.....	1.10	3.20	0.75	0.75	0.90	1.70
4.....	1.10	3.20	0.70	0.55	0.90	1.70
5.....	1.10	3.20	0.70	0.55	0.85	1.35
6.....	1.10	3.20	0.70	0.55	0.80	1.05
7.....	1.10	3.20	0.70	0.55	0.75	0.75
8.....	1.10	3.20	0.70	0.55	0.75	0.75
9.....	1.10	3.20	0.70	0.55	0.75	0.75
10.....	1.10	3.20	0.70	0.55	0.75	0.75
11.....	1.10	3.20	0.70	0.55	0.75	0.75
12.....	0.95	2.05	0.70	0.55	0.75	0.75
13.....	0.95	2.05	0.70	0.55	0.75	*0.75
14.....	0.95	2.05	0.70	0.55	0.95	*1.90
15.....	0.95	2.05	0.80	1.05	0.95	*1.85
16.....	0.95	2.05	0.80	1.05	0.75	*0.60
17.....	0.95	2.05	0.80	1.05	0.95	*1.75
18.....	0.95	2.05	0.70	0.55	0.85	*1.10
19.....	0.95	2.05	0.70	0.55	0.75	*0.55
20.....	0.95	2.05	0.70	0.55	0.75	*0.50
21.....	0.95	2.05	0.70	0.55	0.75	*0.50
22.....	0.95	2.05	0.70	0.55	0.75	*0.45
23.....	0.85	1.35	0.70	0.55	0.95	*1.45
24.....	0.85	1.35	0.70	0.55	0.85	*0.80
25.....	0.85	1.35	0.70	0.55	0.80	*0.55
26.....	0.85	1.35	0.65	0.40	0.75	*0.30
27.....	0.85	1.35	0.65	0.40	0.70	0.15
28.....	0.85	1.35	0.70	0.55	0.70	0.15
29.....	0.82	1.17	0.70	0.55	0.70	0.15
30.....	0.82	1.17	0.70	0.55	0.80	0.50
31.....			0.75	0.75		

* Changing conditions, June 13-26.

DAILY GAUGE HEIGHT AND DISCHARGE of Swiftcurrent Creek at Pollock's Ranche, for 1910.—*Con.*

DAY.	July.		August.		September.		October.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	0.75	0.30	0.85	0.75	0.87	*0.90	0.80	1.05
2.....	0.70	0.15	0.85	0.75	0.87	*0.90	0.80	1.05
3.....	0.70	0.15	0.85	0.75	0.87	*0.95	0.80	1.05
4.....	0.70	0.15	0.80	0.50	0.87	*1.00	0.80	1.05
5.....	0.70	0.15	0.80	0.50	0.87	*1.00	0.80	1.05
6.....	0.70	0.15	0.85	0.75	0.87	*1.05	0.80	1.05
7.....	0.70	0.15	0.85	0.75	0.90	*1.30	0.80	1.05
8.....	0.75	0.30	0.85	0.75	0.92	*1.45	0.80	1.05
9.....	0.75	0.30	0.85	0.75	0.92	*1.50	0.77	0.87
10.....	0.75	0.30	0.85	0.75	0.90	*1.45	0.77	0.87
11.....	0.75	0.30	0.85	0.75	0.90	*1.50	0.78	0.93
12.....	0.75	0.30	0.85	0.75	0.90	*1.55	0.78	0.93
13.....	0.90	1.00	0.85	0.75	0.85	*1.25	0.79	0.99
14.....	0.90	1.00	0.85	0.75	0.85	*1.30	0.79	0.99
15.....	0.90	1.00	0.85	0.75	0.80	*1.05	0.79	0.99
16.....	0.85	0.75	0.85	0.75	0.80	1.05	0.79	0.99
17.....	0.85	0.75	0.85	0.75	0.80	1.05	0.79	0.99
18.....	0.85	0.75	0.85	0.75	0.90	1.70	0.80	1.05
19.....	0.85	0.75	0.85	0.75	0.85	1.35	0.80	1.05
20.....	0.85	0.75	0.85	0.75	0.85	1.35	0.94	1.98
21.....	0.85	0.75	0.85	0.75	0.85	1.35	0.94	1.98
22.....	0.85	0.75	0.85	0.75	0.85	1.35	0.94	1.98
23.....	0.85	9.75	0.85	0.75	0.75	0.75	0.94	1.98
24.....	0.85	0.75	0.85	0.75	0.75	0.75	0.94	1.98
25.....	0.85	0.75	0.85	0.75	0.75	0.75	0.94	1.98
26.....	0.85	0.75	0.85	0.75	0.75	0.75	0.94	1.98
27.....	0.85	0.75	0.85	0.75	0.75	0.75	0.94	1.98
28.....	0.85	0.75	0.85	0.75	0.75	0.75	0.94	1.98
29.....	0.85	0.75	0.85	0.75	0.75	0.75	0.94	1.98
30.....	0.85	0.75	0.85	0.75	0.75	0.75	0.94	1.98
31.....	0.85	0.75	0.85	*0.75	.....	.....	0.94	1.98

* Changing conditions, Aug. 31-Sept. 15.

MONTHLY DISCHARGE of Swiftcurrent Creek at Pollock's Ranche, for 1910.

Drainage area, 12 square miles.

Month.	Discharge in Second-Feet.				Run-Off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on Drainage area.	Total in acre-feet.
April.....	3.20	1.17	2.270	0.189	0.021	135
May.....	1.05	0.40	0.615	0.051	0.059	38
June.....	1.90	0.30	0.895	0.075	0.084	53
July.....	1.00	0.30	0.571	0.048	0.055	35
August.....	0.75	0.50	0.734	0.061	0.070	45
September.....	1.70	0.75	1.110	0.093	0.104	66
October.....	1.98	0.87	1.380	0.115	0.133	85
The period.....						457

JONES COULEE AT READ'S RANCHE.

This station was established September 23, 1909, by H. R. Carscallen. It is located on Sec. 5, Tp. 8, Rge. 20, W. 3rd Mer., about 300 yards from the surveyed trail to Gull Lake and about 42 miles south of Gull Lake. It is about 2½ miles northeast of South Fork P. O., and near the mouth of the stream.

The channel is straight for 75 feet above and 50 feet below the station. Both banks are high and not liable to overflow. The banks are free from brush, except for a little undergrowth on the left bank. The bed of the stream is composed of soft clay with sand underneath. The current is very sluggish and the water comparatively deep at the station, giving rise to a small amount of vegetation.

The gauge, which is read by W. F. Read, is a plain staff, graduated to feet and hundredths, attached vertically to a post sunk in the bed of the creek at the left bank and securely stayed. It is referred to bench marks as follows:—(1) A spike-head in the top of the final stake driven close to the ground on the right bank and marked B. M.; elevation, 8.25 feet above gauge zero. (2) The top of two spikes driven horizontally into the end of a log at the northwest corner of Mr. Read's stable, the log marked B. M.; elevation 11.46 feet above gauge zero.

Discharge measurements are made a short distance upstream from the gauge by wading and at very low stages a weir is used. The initial point for soundings is a square stake driven close to the ground on the left bank and marked I. P. o.o.

DISCHARGE MEASUREMENTS of Jones Coulee at Read's Ranche, in 1910.

DATE.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Dis-charge.
		<i>Feet.</i>	<i>Sq.-ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
April 16.....	H. R. Carscallen.....	5.7	4.48	0.839	2.48	3.75
May 10.....	".....	7.3	8.67	0.114	2.09	0.99*
May 7.....	".....	7.5	6.91	0.090	1.82	0.62*
June 213.....	R. G. Swan.....				1.52	0.13*
July 7.....	".....				1.84	0.37*
August 3.....	".....					Nil.†
August 21.....	".....					Nil.†
September 15.....	".....	8.2	8.70	0.040	1.76	0.31*
October 8.....	".....	8.3	8.36	0.083	1.82	0.70
November 8.....	".....	8.3	9.40	0.126	1.95	1.21

* Discharge determined by using a 15-inch weir.
† Coulee dry from July 30 to August 16.

DAILY GAUGE HEIGHT AND DISCHARGE of Jones Coulee at Read's Ranche, for 1910.

DAY.	April.		May.		June.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....			2.20	1.45	1.75	0.30
2.....			2.20	1.45	1.70	0.25
3.....	2.65	5.58	2.20	1.45	1.70	0.25
4.....	2.65	5.58	2.20	1.45	1.65	0.21
5.....	2.60	5.04	2.20	1.45	1.60	0.17
6.....	2.70	6.12	2.20	1.45	1.65	0.21
7.....	2.75	6.66	2.20	1.45	1.65	0.21
8.....	2.70	6.12	2.10	1.02	1.65	0.21
9.....	2.70	6.12	2.10	1.02	1.60	0.17
10.....	2.75	6.66	2.10	1.02	1.60	0.17
11.....	2.65	5.58	2.10	1.02	1.60	0.17
12.....	2.80	7.20	2.10	1.02	1.65	0.21
13.....	2.75	6.66	2.10	1.02	1.60	0.17
14.....	2.60	5.04	2.10	1.02	2.20	1.45
15.....	2.50	3.96	2.20	1.22	2.10	1.02
16.....	2.45	3.42	2.20	1.22	2.00	0.72
17.....	2.40	2.91	2.20	1.22	1.80	0.36
18.....	2.40	2.91	2.10	1.02	1.80	0.36
19.....	2.40	2.91	2.25	1.72	1.75	0.30
20.....	2.40	2.91	2.20	1.45	1.85	0.43
21.....	2.40	2.91	2.20	1.45	1.65	0.21
22.....	2.40	2.91	2.25	1.72	1.60	0.17
23.....	2.45	3.42	2.10	1.02	1.80	0.36
24.....	2.45	3.42	2.10	1.02	1.85	0.43
25.....	2.40	2.91	1.85	0.43	1.80	0.36
26.....	2.35	2.46	1.80	0.36	1.80	0.36
27.....	2.35	2.46	1.80	0.36	1.80	0.36
28.....	2.30	2.06	1.80	0.36	1.75	0.30
29.....	2.35	2.46	1.75	0.30	1.80	0.36
30.....	2.30	2.06	1.75	0.30	1.80	0.36
31.....			1.75	0.30		

SESSIONAL PAPER No. 25d

DAILY GAUGE HEIGHT AND DISCHARGE of Jones Coulee at Read's Ranche, for 1910.—Continued.

DAY.	July.		August.		September.		October.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	2.00	0.72	.....	.....	1.60	0.17	1.80	0.36
2.....	2.60	5.04	.....	.....	1.60	0.17	1.80	0.36
3.....	2.10	1.02	.....	.....	1.60	0.17	1.80	0.36
4.....	2.20	1.45	.....	.....	†.....	.....	1.80	0.36
5.....	2.10	1.02	.....	.....	.....	.....	1.95	0.60
6.....	2.00	0.72	.....	.....	.....	.....	1.90	0.51
7.....	1.85	0.43	.....	.....	.....	.....	1.90	0.51
8.....	1.85	0.43	.....	.....	.....	.....	1.82	0.39
9.....	1.85	0.43	.....	.....	.....	.....	1.83	0.40
10.....	1.90	0.51	.....	.....	.....	.....	1.83	0.40
11.....	2.10	1.02	.....	.....	.....	.....	1.82	0.39
12.....	2.10	1.02	.....	.....	.....	.....	1.83	0.40
13.....	2.10	1.02	.....	.....	.....	.....	1.82	0.39
14.....	2.00	0.72	.....	.....	.....	.....	1.86	0.45
15.....	1.80	0.36	.....	.....	.....	.....	1.87	0.46
16.....	1.80	0.36	1.70	0.25	.....	.....	1.87	0.46
17.....	1.65	0.21	1.70	0.25	.....	.....	1.86	0.45
18.....	1.65	0.21	1.65	0.21	.....	.....	1.87	0.46
19.....	1.60	0.17	1.65	0.21	.....	.....	1.88	0.48
20.....	1.55	0.14	1.65	0.21	.....	.....	1.88	0.48
21.....	1.55	0.14	1.60	0.17	.....	.....	1.85	0.43
22.....	1.60	0.17	1.60	0.17	.....	.....	1.85	0.43
23.....	1.60	0.17	1.70	0.25	1.85	0.43	1.85	0.43
24.....	1.65	0.21	1.65	0.21	1.85	0.43	1.86	0.45
25.....	1.65	0.21	1.65	0.21	1.80	0.36	1.90	0.51
26.....	1.55	0.14	1.65	0.21	1.80	0.36	1.92	0.55
27.....	1.50	0.12	1.65	0.21	1.80	0.36	1.90	0.51
28.....	1.65	0.21	1.65	0.21	1.80	0.36	1.86	0.45
29.....	1.20	0.01	1.65	0.21	1.80	0.36	1.87	0.46
30.....	1.10	0.00	1.65	0.21	1.80	0.36	1.90	0.51
31.....	*	.....	1.65	0.21	.....	.....	1.92	0.55

* Coulee dry from July 30 to August 16.
† No gauge height observations taken from September 3 to September 23.

MONTHLY DISCHARGE of Jones Coulee at Read's Ranche, for 1910.

Drainage area, 43 square miles.

Month.	Discharge in Second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on Drainage area.	Total in acre-feet.
April (3-30).....	6.66	2.06	4.23	0.098	1.020	235
May.....	1.45	0.30	1.06	0.024	0.027	65
June.....	1.45	0.17	0.35	0.008	0.009	21
July.....	5.04	0.00	0.59	0.014	0.016	36
August.....	0.25	0.00	0.11	0.003	0.004	7
September (11 days).....	0.43	0.17	0.32	0.007	0.003	6
October.....	0.60	0.36	0.45	0.011	0.012	28
The period.....						398

SWIFTCURRENT CREEK AT SINCLAIR'S RANCHE (Upper Station.)

This station was established June 15, 1910, by R. G. Swan. It is located on the S.E. $\frac{1}{4}$ Sec. 18, Tp. 10, Rge. 19, W. 3rd Mer., about 200 feet upstream from the mouth of Bone Creek, and is about 200 yards above the lower station, which is located on the highway bridge on the surveyed trail to Gull Lake, below the mouth of Bone Creek.

The channel is straight for about 200 feet above and below the station. Both banks are fairly high, covered with a growth of willow brush, and not liable to overflow. The bed of the stream is sandy and may shift at high stages.

The gauge is a plain staff, graduated to feet and hundredths, spiked to a vertical post sunk in the bed of the stream at the right bank and stayed.

Discharge measurements are made at the station by wading. The station is close to the mouth of Bone Creek and it will be affected at high stages by backwater from the large stream.

The gauge was read once each day by Geo. A. Mackintosh, who worked at Mr. Sinclair's ranche, about a mile distant from the station.

DISCHARGE MEASUREMENTS of Swiftcurrent Creek at Sinclair's Ranche (Upper Station), in 1910.

Date.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Dis-charge.
		<i>Feet.</i>	<i>Sq. ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
May 28.....	H. R. Carscallen.....	9.5	4.05	0.849	.....	3.44
June 15.....	R. G. Swan.....	9.8	5.55	0.829	0.75	4.60
July 8.....	".....	6.7	1.77	0.571	0.47	1.01
August 2.....	".....	.....	.....	.....	0.14	Nil.*
August 20.....	".....	5.0	0.98	0.316	0.33	0.31
September 14.....	".....	7.1	3.10	0.606	0.54	1.88
October 7.....	".....	7.0	2.84	0.754	0.57	2.14

* No flow, water standing in pools from July 30 to August 6.

SESSIONAL PAPER No. 25d

DAILY GAUGE HEIGHT AND DISCHARGE of Swiftcurrent Creek at Sinclair's
Ranche (Upper Station), for 1910.

DAY.	June.		July.		August.		September.		October.	
	Gauge Height.	Dis- charge.	Gauge Height.	Dis- charge.	Gauge Height.	Dis- charge.	Gauge Height.	Dis- charge.	Gauge Height.	Dis- charge.
	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.
1.....			0.54	1.85	0.15	0.00	0.37	0.52	0.50	1.45
2.....			0.54	1.85	0.14	0.00	0.40	0.70	0.50	1.45
3.....			0.51	1.55	0.14	0.00	0.39	0.64	0.49	1.37
4.....			0.64	3.02	0.13	0.00	0.45	1.05	0.51	1.55
5.....			0.59	2.39	0.15	0.00	0.55	1.95	0.55	1.95
6.....			0.54	1.85	0.25	0.08	0.57	2.17	0.54	1.85
7.....			0.49	1.37	0.39	0.64	0.65	3.15	0.52	1.65
8.....			0.47	1.21	0.45	1.05	0.63	2.89	0.52	1.65
9.....			0.45	1.05	0.41	0.77	0.60	2.50	0.51	1.55
10.....			0.54	1.85	0.34	0.36	0.58	2.28	0.51	1.55
11.....			0.59	2.39	0.30	0.20	0.57	2.17	0.51	1.55
12.....			0.53	1.75	0.30	0.20	0.55	1.95	0.51	1.55
13.....			0.51	1.55	0.31	0.24	0.54	1.85	0.51	1.55
14.....			0.49	1.37	0.34	0.36	0.54	1.85	0.52	1.65
15.....	0.75	4.60	0.46	1.13	0.38	0.58	0.53	1.75	0.52	1.65
16.....	0.7	3.85	0.41	0.77	0.40	0.70	0.52	1.65	0.52	1.65
17.....	0.7	3.85	0.41	0.77	0.40	0.70	0.51	1.55	0.52	1.65
18.....	0.64	3.02	0.39	0.64	0.39	0.64	0.50	1.45	0.53	1.75
19.....	0.58	2.28	0.38	0.58	0.36	0.46	0.50	1.45	0.54	1.85
20.....	0.54	1.85	0.28	0.15	0.29	0.17	0.49	1.37	0.54	1.85
21.....	0.54	1.85	0.35	0.40	0.27	0.13	0.49	1.37	0.54	1.85
22.....	0.53	1.75	0.33	0.32	0.23	0.06	0.50	1.45	0.54	1.85
23.....	0.58	2.28	0.31	0.24	0.29	0.17	0.50	1.45	0.54	1.85
24.....	0.64	3.02	0.29	0.17	0.34	0.36	0.51	1.55	0.55	1.95
25.....	0.54	1.85	0.26	0.10	0.40	0.70	0.53	1.75	0.55	1.95
26.....	0.47	1.21	0.25	0.08	0.38	0.58	0.53	1.75	0.56	2.06
27.....	0.46	1.13	0.24	0.07	0.35	0.40	0.52	1.65	0.56	2.06
28.....	0.43	0.91	0.21	0.03	0.34	0.36	0.52	1.65	0.57	2.17
29.....	0.45	1.05	0.19	0.02	0.32	0.28	0.52	1.65	0.59	2.39
30.....	0.51	1.55	0.19	0.02	0.30	0.20	0.51	1.55	0.60	2.50
31.....			0.15	*0.00	0.34	0.36	.....	.....	0.61	2.63

* No flow, water standing in pools from July 30 to August 6.

MONTHLY DISCHARGE of Swiftcurrent Creek at Sinclair's Ranche (Upper Station), for 1910.

Drainage area, 162 square miles.

Month.	Discharge in Second-Feet.				Run-Off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on Drainage area.	Total in acre-feet.
June (15-30).....	4.60	0.91	2.253	0.014	0.008	72
July.....	3.02	0.00	0.985	0.006	0.0007	61
August.....	1.05	0.00	0.347	0.002	0.0024	21
September.....	3.15	0.52	1.690	0.010	0.011	101
October.....	2.63	1.37	1.806	0.011	0.013	111
The period.....						366

BONE CREEK AT LEWIS' RANCHE.

This station was established July 2, 1908, by F. T. Fletcher. It is located at the highway bridge on Sec. 34, Tp. 8, Rge. 22, W. 3rd Mer. It is on the surveyed trail from Skull Creek P.O. to East End P. O. and about fifteen miles south of Skull Creek P. O., by trail. The bridge is a small wooden structure, built in the form of a culvert with a rectangular cross-section.

The channel is straight for 50 feet above the station; below the station it curves gradually to the left after emerging from the downstream side of the bridge. The right bank is high and will not overflow; the left bank is comparatively low, but no indication of the water overflowing the bank can be found. Both banks are free from brush at the station. The bed of the stream is sandy with some large stones scattered along the cross-section. The current is moderate, becoming very swift below the station.

The gauge, which is read daily by C. L. Lewis, is a plain staff, graduated to feet and hundredths, attached vertically to the left abutment on the upstream side of the bridge. The gauge is referred to bench marks as follows:—(1) The head of a spike surrounded by a circle of nail-heads in the top of the stringer on the left abutment at the upstream side of the bridge, marked B. M. with white paint; elevation, 4.17 feet above the zero of the gauge. (2) The top of the iron pin in the road mound 754 feet north of the bridge on the left bank of the creek; elevation, 5.92 feet above the zero of the gauge.

Discharge measurements are made from the upstream side of the bridge during high water. The initial point for soundings is the inner face of the left abutment. Low-water measurements are made near the station by wading.

DISCHARGE MEASUREMENTS of Bone Creek at Lewis' Ranche, in 1910.

DATE	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Dis-charge.
		<i>Feet.</i>	<i>Sq.-ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
April 14.....	H. R. Carscallen.....	7.5	3.23	0.796	0.40	2.57
May 9.....	".....	7.5	2.81	0.676	0.34	1.90
May 26.....	".....	7.5	3.07	0.496	0.34	1.53
June 13.....	R. G. Swan.....	7.4	2.83	0.537	0.35	1.52
July 7.....	".....	7.5	2.64	0.553	0.25	1.46
August 7.....	".....	7.2	2.47	0.393	0.21	0.97
August 27.....	".....	7.0	2.44	0.594	0.31	1.45
September 17.....	".....	6.7	2.42	0.591	0.34	1.43
October 14.....	".....	6.8	2.54	0.604	0.32	1.53

DAILY GAUGE HEIGHT AND DISCHARGE of Bone Creek at Lewis' Ranche, for 1910.

DAY.	April.		May.		June.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	0.4	2.5	0.40	2.5	0.35	1.9
2.....	0.4	2.5	0.40	2.5	0.35	1.9
3.....	0.4	2.5	0.40	2.5	0.40	2.5
4.....	0.4	2.5	0.40	2.5	0.40	2.5
5.....	0.4	2.5	0.40	2.5	0.40	2.5
6.....	0.4	2.5	0.40	2.5	0.40	2.5
7.....	0.4	2.5	0.40	2.5	0.40	2.5
8.....	0.4	2.5	0.40	2.5	0.40	2.5
9.....	0.4	2.5	0.35	1.9	0.35	1.9
10.....	0.4	2.5	0.35	1.9	0.35	1.9
11.....	0.4	2.5	0.40	2.5	0.35	1.9
12.....	0.4	2.5	0.40	2.5	0.35	1.9
13.....	0.4	2.5	0.40	2.5	0.35	1.9
14.....	0.4	2.5	0.40	2.5	0.35	1.9
15.....	0.4	2.5	0.50	4.8	0.40	2.5
16.....	0.4	2.5	0.40	2.5	0.40	2.5
17.....	0.4	2.5	0.40	2.5	0.50	4.8
18.....	0.4	2.5	0.40	2.5	0.45	3.5
19.....	0.4	2.5	0.40	2.5	0.45	3.5
20.....	0.4	2.5	0.40	2.5	0.40	2.5
21.....	0.4	2.5	0.40	2.5	0.35	1.9
22.....	0.4	2.5	0.40	2.5	0.35	1.9
23.....	0.4	2.5	0.40	2.5	0.35	1.9
24.....	0.4	2.5	0.40	2.5	0.35	1.9
25.....	0.4	2.5	0.30	1.4	0.35	1.9
26.....	0.4	2.5	0.30	1.4	0.30	1.4
27.....	0.4	2.5	0.30	1.4	0.30	1.4
28.....	0.4	2.5	0.40	2.5	0.30	1.4
29.....	0.4	2.5	0.40	2.5	0.25	1.1
30.....	0.4	2.5	0.40	2.5	0.25	1.1
31.....			0.40	2.5		

DAILY GAUGE HEIGHT AND DISCHARGE of Bone Creek at Lewis' Ranche, for 1910.—Continued.

DAY.	July.		August.		September.		October.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.
1.....	0.30	1.4	0.25	1.1	0.30	1.4	0.30	1.4
2.....	0.30	1.4	0.25	1.1	0.30	1.4	0.30	1.4
3.....	0.30	1.4	0.25	1.1	0.30	1.4	0.30	1.4
4.....	0.30	1.4	0.25	1.1	0.30	1.4	0.35	1.9
5.....	0.30	1.4	0.20	0.9	0.30	1.4	0.32	1.6
6.....	0.30	1.4	0.25	1.1	0.30	1.4	0.31	1.5
7.....	0.30	1.4	0.20	0.9	0.30	1.4	0.30	1.4
8.....	0.30	1.4	0.20	0.9	0.30	1.4	0.30	1.4
9.....	0.30	1.4	0.20	0.9	0.30	1.4	0.30	1.4
10.....	0.30	1.4	0.20	0.9	0.30	1.4	0.30	1.4
11.....	0.30	1.4	0.20	0.9	0.30	1.4	0.30	1.4
12.....	0.30	1.4	0.20	0.9	0.30	1.4	0.30	1.4
13.....	0.30	1.4	0.40	2.5	0.30	1.4	0.30	1.4
14.....	0.30	1.4	0.30	1.4	0.30	1.4	0.32	1.6
15.....	0.20	0.9	0.30	1.4	0.30	1.4	0.32	1.6
16.....	0.20	0.9	0.35	1.9	0.30	1.4	0.32	1.6
17.....	0.20	0.9	0.30	1.4	0.34	1.8	0.32	1.6
18.....	0.20	0.9	0.30	1.4	0.34	1.8	0.32	1.6
19.....	0.20	0.9	0.30	1.4	0.36	2.0	0.32	1.6
20.....	0.20	0.9	0.30	1.4	0.3	2.0	0.32	1.6
21.....	0.20	0.9	0.30	1.4	0.36	2.0	0.32	1.6
22.....	0.20	0.9	0.35	1.9	0.30	1.4	0.31	1.5
23.....	0.20	0.9	0.35	1.9	0.30	1.4	0.32	1.6
24.....	0.20	0.9	0.35	1.9	0.31	1.5	0.32	1.6
25.....	0.20	0.9	0.30	1.4	0.31	1.5	0.32	1.6
26.....	0.20	0.9	0.30	1.4	0.31	1.5	0.21	0.9
27.....	0.20	0.9	0.30	1.4	0.30	1.4	0.21	0.9
28.....	0.25	1.1	0.30	1.4	0.30	1.4	0.32	1.6
29.....	0.25	1.1	0.30	1.4	0.30	1.4	0.32	1.6
30.....	0.25	1.1	0.30	1.4	0.30	1.4	0.32	1.6
31.....	0.25	1.1	0.30	1.4			0.21	0.9

MONTHLY DISCHARGE of Bone Creek at Lewis' Ranche, for 1910.

Drainage area, 8 square miles.

Month.	Discharge in Second-Feet.				Run-Off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on Drainage area.	Total in acre-feet.
April.....	2.5	2.5	2.50	0.312	0.348	149
May.....	4.8	1.4	2.43	0.304	0.350	149
June.....	4.8	1.1	2.18	0.272	0.304	130
July.....	1.4	0.9	1.15	0.144	0.166	71
August.....	2.5	0.9	1.34	0.167	0.193	82
September.....	2.0	1.4	1.50	0.187	0.209	89
October.....	1.9	0.9	1.47	0.184	0.212	90
The period.....						760

SWIFTCURRENT CREEK AT SINCLAIR'S RANCHE (Lower Station.)

This station was established on May 27, 1910, by H. R. Carscallen. It is located in Sec. 17, Tp. 10, Rge. 19, W. 3rd Mer., at the highway bridge on the surveyed trail from East End to Gull Lake, and just below the mouth of Bone Creek.

The channel is straight for 75 feet above and 20 feet below the station. The left bank has a gradual slope, is high and well wooded. The right bank rises abruptly. It is also high and well wooded. The stream bed is sandy in character, free from vegetation and liable to shift at high water. The current at this point is sluggish.

Discharge measurements are made from the downstream side of the bridge. The initial point for soundings is the inner face of the left abutment. Low water measurements are made by wading, 100 feet upstream.

The gauge is of the standard chain type. The box is nailed securely to the floor of the bridge on the downstream side. The length of chain from bottom of weight to marker is 21.2 feet. The elevation of the gauge is referred to two bench marks, as follows:—(1) A spike-head in the cap of the left abutment of the bridge on the downstream side and marked B. M.; elevation, 16.96 above the datum of the gauge, and (2) two spikes driven in the first pile of the left wing wall on the downstream side of the bridge and marked B. M.; elevation, 12.09 above the zero of the gauge.

This gauge was also read by Geo. A. Mackintosh.

DISCHARGE MEASUREMENTS of Swiftcurrent Creek at Sinclair's Ranche (Lower Station), in 1910.

DATE	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Dis-charge.
		<i>Feet.</i>	<i>Sq.-ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
May 28.....	H. R. Carscallen.....	16.5	32.74	0.454	3.05	14.88
June 15.....	R. G. Swan.....	18.5	35.30	0.614	3.36	21.69
July 8.....	".....	17.0	26.20	0.362	2.75	9.49
August 2.....	".....	14.5	17.27	0.111	2.27	1.92
August 20.....	".....	15.5	25.47	0.258	2.73	6.57
September 14.....	".....	17.3	28.94	0.383	2.86	11.09
October 7.....	".....	15.0	30.06	0.452	2.99	13.59
November 7.....	".....	25.0	35.75	0.498	3.22	17.56*

* Measurement taken at wading station.

DAILY GAUGE HEIGHT AND DISCHARGE of Swiftcurrent Creek at Sinclair's Ranche (Lower Station), for 1910.

DAY.	May.		June.		July.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....			3.02	14.30	2.97	13.30
2.....			3.05	14.90	2.82	10.30
3.....			3.43	23.16	2.81	10.10
4.....			3.38	22.06	2.92	12.30
5.....			3.27	19.64	2.85	10.90
6.....			3.19	17.88	2.82	10.30
7.....			3.10	15.90	2.78	9.50
8.....			3.07	15.30	2.75	8.90
9.....			2.98	13.50	2.74	8.72
10.....			2.95	12.90	2.88	11.50
11.....			2.88	11.50	3.01	14.10
12.....			2.87	11.30	2.88	11.50
13.....			2.86	11.10	2.75	8.90
14.....			3.08	15.50	2.70	8.00
15.....			3.33	20.96	2.61	6.38
16.....			3.12	16.34	2.52	4.98
17.....			3.34	21.18	2.50	4.70
18.....			3.17	17.44	2.46	4.14
19.....			2.86	11.10	2.43	3.72
20.....			2.86	11.10	2.37	2.94
21.....			2.84	10.70	2.41	3.44
22.....			2.83	10.50	2.59	6.04
23.....			3.00	13.90	2.57	5.72
24.....			3.11	16.12	2.56	5.56
25.....			3.10	15.90	2.55	5.40
26.....			2.79	9.70	2.51	4.84
27.....	3.02	14.30	2.73	8.54	2.49	4.56
28.....	3.05	14.90	2.68	7.64	2.42	3.58
29.....	3.08	15.50	2.64	6.92	2.42	3.58
30.....	3.06	15.10	2.93	12.50	2.39	3.18
31.....	3.05	14.90			2.36	2.82

DAILY GAUGE HEIGHT AND DISCHARGE of Swiftcurrent Creek, at Sinclair's Ranche,
(Lower Station), for 1910.—Continued.

DAY.	August.		September.		October.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.
1.....	2.29	2.12	2.75	8.90	2.95	12.90
2.....	2.31	2.30	2.75	8.90	2.95	12.90
3.....	2.35	2.70	2.74	8.72	2.94	12.70
4.....	2.35	2.70	2.87	11.30	2.96	13.10
5.....	2.41	3.44	3.05	14.90	3.04	14.70
6.....	2.52	4.98	3.07	15.30	3.04	14.70
7.....	2.74	8.72	3.10	15.90	2.97	13.30
8.....	2.70	8.00	3.10	15.90	2.96	13.10
9.....	2.69	7.82	2.99	13.70	2.96	13.10
10.....	2.61	6.38	2.96	13.10	2.95	12.90
11.....	2.55	5.40	2.95	12.90	2.95	12.90
12.....	2.53	5.12	2.93	12.50	2.95	12.90
13.....	2.55	5.40	2.91	12.10	2.95	12.90
14.....	2.59	6.04	2.89	11.70	2.96	13.10
15.....	2.74	8.72	2.88	11.50	2.96	13.10
16.....	2.85	10.90	2.87	11.30	2.96	13.10
17.....	2.83	10.50	2.87	11.30	2.98	13.50
18.....	2.79	9.70	2.85	10.90	2.99	13.70
19.....	2.74	8.72	2.85	10.90	3.01	14.10
20.....	2.69	7.82	2.86	11.10	3.02	14.30
21.....	2.69	7.82	2.86	11.10	3.02	14.30
22.....	2.66	7.28	2.87	11.30	3.02	14.30
23.....	2.70	8.00	2.89	11.70	3.02	14.30
24.....	2.73	8.54	2.94	12.70	3.03	14.50
25.....	2.83	10.50	3.05	14.90	3.03	14.50
26.....	2.80	9.90	3.10	15.90	3.03	14.50
27.....	2.76	9.10	3.15	17.00	3.04	14.70
28.....	2.74	8.72	3.11	16.12	3.04	14.70
29.....	2.73	8.54	3.05	14.90	3.04	14.70
30.....	2.72	8.36	2.99	13.70	3.05	14.90
31.....	2.73	8.54	.....	.....	3.06	15.10

MONTHLY DISCHARGE of Swiftcurrent Creek at Sinclair's Ranche
(Lower Station), for 1910.

Drainage area, 336 square miles.

Month.	Discharge in Second-Feet.				Run-Off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on Drainage area.	Total in acre-feet.
May (27-31).....	15.50	14.30	14.940	0.045	0.008	148
June.....	23.16	6.92	14.316	0.043	0.048	852
July.....	14.10	2.82	7.223	0.022	0.025	444
August.....	10.90	2.12	7.186	0.021	0.024	442
September.....	17.00	8.72	12.738	0.038	0.042	758
October.....	15.10	12.70	13.790	0.041	0.047	848
The period.....	.....	.....	.....	.....	.....	3,492

SWIFTCURRENT CREEK AT SWIFT CURRENT.

This station was established April 30, 1910, by H. R. Carscallen. It is located at the traffic bridge on the north side of the C. P. R. tracks in the town of Swiftcurrent on Sec. 30, Tp. 15, Rge. 13, W. 3rd Mer.

The channel curves slightly but is almost straight for about 300 feet above the station, and is straight for about 300 feet below. The right bank is rather low with a gradual slope; the left bank is high. Both banks are clear of brush and undergrowth and are not liable to overflow. The bed of the stream is sandy with a few large stones and is liable to shift at high stages. Stones in the cross-section affect the regularity of the current to some extent. The current is sluggish at low stages.

The gauge is a plain staff, graduated to feet and hundredths, spiked vertically to the inside face of the left abutment of the bridge. It is referred to two bench marks:—(1) Top of two spikes in the opposite face of abutment to which the gauge is attached; elevation, 7.11. (2) Top of bolt-head in the top of the right abutment; elevation, 13.49.

During ordinary stages, discharge measurements are made from the downstream side of the bridge, but at low stages, they are made by wading near the bridge. The initial point for soundings is the inner face of the row of piles at end of the south approach.

The gauge was read once each day by C. E. Wesley, a teamster living within 200 yards of the bridge.

The survey did not obtain sufficient data during 1910, to plot a gauge height discharge curve and the records for 1910 are therefore not published in this report, but will be included in the next annual report.

MISCELLANEOUS DISCHARGE MEASUREMENTS of Swiftcurrent Creek Drainage Basin, in 1910.

DATE.	Stream.	Locality.	Hydrographer.	Width.	Area of section.	Dis-charge.
				<i>Feet.</i>	<i>Sq.-ft.</i>	<i>Sec.-ft.</i>
May 9.....	D. Pollock's Ditch	.....	H. R. Carscallen..	2.3	0.55	0.63
May 30.....	"	.....	"	3.0	0.88	0.77
June 16.....	"	.....	R. G. Swan.....	3.1	1.15	0.91
July 9.....	"	.....	"	2.8	0.81	0.60
August 3.....	"	.....	"	.....	.....	Dry.

ANTELOPE LAKE DRAINAGE BASIN.

General Description.

Antelope Lake is a small body of saline water, 6 miles long, and from 1 to 1½ miles wide. Its elevation is 2,304 feet above sea level. It lies in a deep depression north of the main line of the Canadian Pacific Railway, in Tp. 15, Rge. 18, W. 3rd Mer., and drains an area of about 350 sq. miles.

The lake receives its supply from Bridge Creek which rises in the Cypress Hills. The altitude of the source of this creek is 2,800 feet, and it has an average fall of 15 feet per mile.

The valley traversed by Bridge Creek is narrow and quite shallow, rarely exceeding 100 feet in depth. The land lying along the creek bottom is very flat and liable to become inundated during periods of flood. The bench land is rolling prairie cut up by innumerable coulees which drain the surrounding country into the main valley.

The mean annual rainfall amounts to about 14 inches, most of which occurs during May, June and July. The creek has only a small flow, and is dry for some months.

A number of irrigation schemes receive their supply from this basin. The largest of these is Moorehead and Fearon's works which diverts water from Bridge Creek in Sec. 33, Tp. 10, Rge. 22, W. 3rd Mer.

BRIDGE CREEK, NEAR SKULL CREEK,

This station was established July 29, 1909, by H. R. Carscallen. It is located at the highway bridge on the surveyed trail running eastward from Maple Creek on Sec. 11, Tp. 11, Rge. 22, W. 3rd Mer. It is about 4 miles from Skull Creek P. O., and 27 miles from Maple Creek.

The channel is straight for 100 feet above and 30 feet below the station. Both banks are high and not liable to overflow. The stream is entirely devoid of tree growth. The bed of the creek is composed of clay and may shift somewhat at high stages. There is a small amount of vegetation at the station. The current is sluggish.

The gauge, which is read once each day by James Mann, is a plain staff, graduated to feet and hundredths, attached vertically to the centre pile on the downstream side of the bridge. The gauge is referred to bench marks as follows:—(1) The head of a spike surrounded by a circle of nail-heads in the top of the stringer at the right or east abutment on the downstream side of the bridge; elevation, 9.83 feet above gauge zero. (2) The head of a spike in the top of a pointed 6 inch wooden post firmly sunk into the ground on the left bank about 60 feet northwest of the gauge, the post blazed and marked B. M.; elevation, 6.26 feet above gauge zero.

During high water discharge measurements are made from the downstream side of the bridge. The initial point for soundings is the inner face of the left or west abutment. Low-water measurements are made near the bridge by wading, and at very low stages a weir is used.

DISCHARGE MEASUREMENTS at Bridge Creek, near Skull Creek, in 1910.

DATE	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Dis-charge.
		<i>Feet.</i>	<i>Sq.-ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
April 13.....	H. R. Carscallen.....	6.5	3.21	0.296	1.57	0.95
May 7.....	".....				1.13	0.08*
May 25.....	".....	3.5	0.60	0.066	1.08	0.04*
June 10.....	R. G. Swan.....				0.83	Nil.
July 6.....	G. H. Whyte.....					Nil.
July 30.....	".....					Nil.
August 19.....	R. G. Swan.....					Nil.

* Discharge determined by using a 15 -inch weir.

DAILY GAUGE HEIGHT AND DISCHARGE of Bridge Creek, near Skull Creek, for 1910.

DAY.	April.		May.		June.	
	Gauge Height	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	1.7	1.35	1.3	0.32	1.1	0.06
2.....	1.7	1.35	1.3	0.32	1.0	0.01
3.....	1.7	1.35	1.3	0.32	0.9	* 0.00
4.....	1.7	1.35	1.3	0.32	0.9	0.00
5.....	1.7	1.35	1.3	0.32	0.9	0.00
6.....	1.7	1.35	1.2	0.17	0.9	0.00
7.....	1.7	1.35	1.1	0.06	0.9	0.00
8.....	1.7	1.35	1.1	0.06	0.9	0.00
9.....	1.7	1.35	1.1	0.06	0.9	0.00
10.....	1.6	1.03	1.1	0.06	0.8	0.00
11.....	1.6	1.03	1.1	0.06	0.7	0.00
12.....	1.6	1.03	1.1	0.06	0.7	0.00
13.....	1.6	1.03	1.1	0.06	0.7	0.00
14.....	1.6	1.03	1.1	0.06	0.7	0.00
15.....	1.6	1.03	1.2	0.17	0.7	0.00
16.....	1.5	0.75	1.2	0.17	0.7	0.00
17.....	1.4	0.51	1.2	0.17	0.7	0.00
18.....	1.4	0.51	1.2	0.17	0.5	0.00
19.....	1.4	0.51	1.2	0.17	†.....	
20.....	1.4	0.51	1.2	0.17	.....
21.....	1.4	0.51	1.2	0.17	.....
22.....	1.4	0.51	1.2	0.17	.....
23.....	1.3	0.32	1.1	0.06	.....
24.....	1.3	0.32	1.1	0.06	.....
25.....	1.3	0.32	1.1	0.06	.....
26.....	1.2	0.17	1.1	0.06	.....
27.....	1.2	0.17	1.1	0.06	.....
28.....	1.2	0.17	1.1	0.06	.....
29.....	1.3	0.32	1.1	0.06	.....
30.....	1.3	0.32	1.1	0.06	.....
31.....	.....	.....	1.1	0.06	.....

* No flow, water standing in pools from June 2 to June 19.

† Creek dry from June 18 to end of year.

MONTHLY DISCHARGE of Bridge Creek, near Skull Creek, for 1910.

Drainage area, 15 square miles.

Month.	Discharge in Second-Feet.				Run-Off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches Drainage area.	Total in acre-feet.
April.....	1.35	0.17	0.81	0.054	0.06	48
May.....	0.32	0.06	0.13	0.009	0 01	8
The period.....	.....	.....	.....	.....	.....	56

MISCELLANEOUS DISCHARGE MEASUREMENTS of Antelope Lake Drainage Basin, in 1910.

DATE.	Stream.	Locality.	Hydrographer.	Width.	Area of Section.	Discharge.
				<i>Feet.</i>		<i>Sec.-ft.</i>
June 18.....	Bridge Creek.....	33-10-22-3.....	R. J. Burley.....	*		0.16
June 24.....	".....	".....	".....	*		0.22
June 24.....	".....	".....	".....	*		0.18

* Weir measurements.

LAKE OF THE NARROWS DRAINAGE BASIN.

General Description.

Lake of the Narrows is a small lake, 3 miles long and 1½ miles wide, in Township 3, Range 23. West of the 3rd Meridian. It has a drainage area of about 200 square miles.

The principal stream in the basin is Skull Creek, which rises in the eastern slope of Cypress Hills. It flows through a small valley for the greater part of its course, and as it nears the lake, the valley widens out into large meadows. The surrounding country is rolling prairie.

In very dry years, such as 1910, Skull Creek goes dry for a short time. The mean annual precipitation in the drainage basin is about 13 inches.

There are several small irrigation ditches in this drainage basin, the largest of which is Moorhead and Fearon's ditch, which diverts water from Skull Creek.

SKULL CREEK, NEAR SKULL CREEK.

This station was established June 29, 1908, by F. T. Fletcher. It is located on Sec. 10, Tp. 11, Rge. 22, W. 3rd Mer., at the highway bridge on the surveyed trail running east from Maple Creek. It is about two miles north of Skull Creek P. O., and about twenty-five miles east of Maple Creek, by trail.

The channel is straight for 100 feet above and 150 feet below the station. Both banks are high and not liable to overflow. The banks are clear of brush for about 50 feet above and below the station, and then become densely wooded. The bed of the stream is composed of sand and may shift somewhat at high stages. The current is moderate.

The gauge, which is read once each day by James Mann, is a plain staff, graduated to feet and hundredths, attached vertically to the centre pile on the upstream or south side of the bridge. The gauge is referred to bench marks as follows:—(1) A bolt-head surrounded by a circle of nails in the top of the stringer at the right or east abutment on the upstream side of the bridge; elevation, 11.96 feet above the zero of the gauge. (2) The top of the iron pin in the road mound about 50 feet southeast of the bridge on the right or east bank; elevation, 14.19 feet above the zero of the gauge.

Discharge measurements are made from the upstream side of the bridge. The initial point for soundings is the inner face of the right abutment of the bridge. There is only one channel at low stages, but owing to the centre row of piles supporting the bridge there are two channels at high stages of the stream. Low-water measurements are made at or near the gauge by wading, and at very low stages a weir is used.

DISCHARGE MEASUREMENTS of Skull Creek, near Skull Creek, in 1910.

DATE.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Discharge.
		<i>Feet.</i>	<i>Sq.-ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
April 13.....	H. R. Carscallen.....	7.8	5.24	0.948	1.04	4.97
May 7.....	".....	6.9	2.95	0.820	0.82	2.42
May 25.....	".....	6.6	2.74	0.701	0.72	1.92
June 10.....	R. G. Swan.....	6.4	2.29	0.629	0.73	1.44
July 6.....	G. H. Whyte.....	4.0	0.87	0.552	0.41	0.48
July 30.....	".....					*Nil.
August 19.....	R. G. Swan.....	4.0	0.78	0.449	0.41	0.35
September 14.....	H. R. Carscallen.....	6.8	2.04	0.594	0.63	1.22
October 7.....	R. G. Swan.....	5.6	2.15	0.761	0.67	1.64
November 5.....	".....	6.4	2.74	0.687	0.71	1.88

* Creek dry from July 14 to August 10, and from August 12 to August 16.



Spray River, near Banff, Alta. ; in Summer.



Spray River, near Banff, Alta. ; in Winter.

SESSIONAL PAPER No. 25d

DAILY GAUGE HEIGHT AND DISCHARGE of Skull Creek, near Skull Creek, for 1910.

DAY.	April.		May.		June.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	1.04	5.0	0.9	3.5	0.7	1.8
2.....	1.0	4.5	0.9	3.5	0.7	1.8
3.....	1.0	4.5	0.9	3.5	0.8	2.6
4.....	0.9	3.5	0.9	3.5	0.8	2.6
5.....	1.0	4.5	0.9	3.5	0.8	2.6
6.....	1.0	4.5	0.9	3.5	0.8	2.6
7.....	1.0	4.5	0.8	2.6	0.7	1.8
8.....	0.9	3.5	0.8	2.6	0.7	1.8
9.....	1.0	4.5	0.8	2.6	0.7	1.8
10.....	1.0	4.5	0.8	2.6	0.7	1.8
11.....	1.0	4.5	0.8	2.6	0.6	1.1
12.....	1.0	4.5	0.8	2.6	0.6	1.1
13.....	1.0	4.5	0.8	2.6	0.5	0.6
14.....	1.0	4.5	0.8	2.6	0.5	0.6
15.....	1.0	4.5	0.9	3.5	0.5	0.6
16.....	1.0	4.5	1.1	5.7	0.6	1.1
17.....	1.0	4.5	1.1	5.7	0.8	2.6
18.....	1.0	4.5	1.0	4.5	0.7	1.8
19.....	1.0	4.5	1.0	4.5	0.6	1.1
20.....	1.0	4.5	1.0	4.5	0.5	0.6
21.....	1.0	4.5	0.9	3.5	0.3	*0.1
22.....	1.0	4.5	0.9	3.5	0.5	0.6
23.....	1.0	4.5	0.8	2.6	0.6	1.1
24.....	1.0	4.5	0.8	2.6	0.5	0.6
25.....	1.0	4.5	0.7	1.8	0.5	0.6
26.....	1.0	4.5	0.7	1.8	0.4	0.3
27.....	1.0	4.5	0.7	1.8	0.3	0.1
28.....	0.9	3.5	0.7	1.8	0.2	*0.05
29.....	0.9	3.5	0.7	1.8	0.1	*0.0
30.....	0.9	3.5	0.7	1.8	0.0	*0.0
31.....			0.7	1.8		

* Stream was diverted above gauge.

DAILY GAUGE HEIGHT AND DISCHARGE of Skull Creek, near Skull Creek, for 1910.—*Con.*

DAY.	July.		August.		September.		October.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	0.0	*0.0	.....	.....	0.50	0.6	0.65	1.40
2.....	0.2	0.05	.....	.....	0.60	1.1	0.65	1.40
3.....	0.3	0.1	.....	.....	0.70	1.8	0.66	1.52
4.....	0.4	0.3	.....	.....	0.80	2.6	0.66	1.52
5.....	0.5	0.6	.....	.....	0.70	1.8	0.72	1.96
6.....	0.4	0.3	.....	.....	0.70	1.8	0.75	2.20
7.....	0.3	0.1	.....	.....	0.90	3.5	0.68	1.66
8.....	0.3	0.1	.....	.....	1.00	4.5	0.70	1.80
9.....	0.3	0.1	.....	.....	0.80	2.6	0.70	1.80
10.....	0.5	0.6	0.2	0.05	0.70	1.8	0.70	1.80
11.....	0.7	1.8	0.1	0.0	0.70	1.8	0.78	2.44
12.....	0.5	0.6	.....	.....	0.70	1.8	0.78	2.44
13.....	0.3	0.1	.....	.....	0.70	1.8	0.78	2.44
14.....	0.2	0.05	.....	.....	0.63	1.31	0.79	2.52
15.....	0.0	†.....	.....	.....	0.56	0.90	0.79	2.52
16.....	.....	.....	0.5	0.6	0.55	0.85	0.79	2.52
17.....	.....	.....	0.6	1.1	0.55	0.85	0.80	2.60
18.....	.....	.....	0.5	0.6	0.56	0.90	0.80	2.60
19.....	.....	.....	0.4	0.3	0.56	0.90	0.82	2.78
20.....	.....	.....	0.4	0.3	0.56	0.90	0.85	3.05
21.....	.....	.....	0.4	0.3	0.56	0.90	0.82	2.78
22.....	.....	.....	0.4	0.3	0.58	1.00	0.82	2.78
23.....	.....	.....	0.4	0.3	0.59	1.05	0.82	2.78
24.....	.....	.....	0.4	0.3	0.66	1.52	0.82	2.78
25.....	.....	.....	0.6	1.1	0.70	1.80	0.85	3.05
26.....	.....	.....	0.5	0.6	0.72	1.96	0.87	3.23
27.....	.....	.....	0.5	0.6	0.65	1.40	0.86	3.14
28.....	.....	.....	0.5	0.6	0.64	1.38	0.84	2.96
29.....	.....	.....	0.5	0.6	0.62	1.24	0.82	2.78
30.....	.....	.....	0.5	0.6	0.62	1.24	0.81	2.69
31.....	.....	.....	0.5	0.6	.....	.....	0.80	2.60

* Stream was diverted above gauge.
† Creek dry July 15, Aug. 9 and Aug. 11-15.

MONTHLY DISCHARGE of Skull Creek, near Skull Creek P. O., for 1910.
Drainage area, 43 square miles.

Month.	Discharge in Second-Feet.				Run-Off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on Drainage area.	Total in acre-feet.
April.....	5.00	3.50	4.35	0.101	0.113	259
May.....	5.70	1.80	3.06	0.071	0.082	188
June.....	2.60	0.00	1.20	0.028	0.031	71
July.....	1.80	0.00	0.16	0.004	0.004	9
August.....	1.10	0.00	0.28	0.007	0.008	17
September.....	4.50	0.60	1.58	0.037	0.041	94
October.....	3.23	1.40	2.40	0.056	0.065	148
The period.....	.....	.....	.....	.....	.....	786

MISCELLANEOUS DISCHARGE MEASUREMENTS of Lake of the Narrows Drainage Basin, in 1910.

DATE	Stream.	Locality.	Hydrographer.	Width.	Area of Section.	Discharge
				<i>Feet.</i>		<i>Sec.-ft.</i>
June 18.....	Skull Creek.....	S.E. 32-10-22-3....	R. J. Burley.....	7.6	2.51	1.62
June 18.....	".....	".....	".....	7	1.74	1.44
June 23.....	".....	".....	".....	7.1	2.46	1.33
June 24.....	".....	".....	".....	9	4.55	2.16
June 5.....	".....	".....	".....	8.4	3.34	0.95

CRANE LAKE DRAINAGE BASIN.

General Description.

Crane Lake is one of the largest of the many lakes which receive their supply from the drainage on the northern slope of the Cypress Hills. It is situated in Tp. 13, Rge. 23, W. 3rd Mer., and covers an area of 25 square miles.

The lake which has no outlet is shallow and the water saline in character, There are only two streams of importance in this basin, namely: Piapot and Bear Creeks, which rise in the Cypress Hills and join in Sec. 7, Tp. 12, Rge. 23, W. 3rd Mer.

To the north of the lake the Sand Hills extend northwestward for forty miles. South of the lake and along the course of Piapot and Bear Creeks the country is rolling prairie.

The mean annual rainfall which occurs chiefly during the spring months amounts to about 12 inches.

During the winter season, from November to March, the streams are frozen over.

EAST BRANCH OF BEAR CREEK AT JOHNSON'S RANCHE.

This station was established August 18, 1909, by H. R. Carscallen. It is located on Sec. 21, Tp. 10, Rge. 23, W. 3rd Mer., about a mile and a half southeast of Skibereen P. O.

The channel is straight for 50 feet above and 40 feet below the station. Both banks are high and not liable to overflow, unless in cases of extreme floods. The banks are free from brush at the station, but are wooded above and below. The bed of the stream is composed of coarse gravel and stones. The large stones in the bed of the stream make accurate soundings at the station rather difficult to obtain. The current is moderate.

The gauge, which is read once each day by Ralph Johnson, is a plain staff, graduated to feet and hundredths, attached to a vertical post sunk in the bed of the stream at the right bank and securely stayed. The gauge is referred to bench marks as follows:—(1) A spike-head in the top of a pointed black-birch stump on the high bank about 40 feet southeast of the gauge, the stump blazed and marked B. M.; elevation, 8.99 feet above the zero of the gauge. (2) A spike-head in the top of a pointed black-birch stump, on the right bank about 30 feet northeast of the gauge the stump blazed and marked B. M.; elevation, 6.89 feet above the zero of the gauge.

Discharge measurements are made at or near the gauge by wading. The initial point for soundings is a square stake driven close to the ground on the left bank and marked I. P. o.o.

DISCHARGE MEASUREMENTS of East Branch of Bear Creek at Johnson's Ranche, in 1910.

DATE.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Dis-charge.
		<i>Feet.</i>	<i>Sq.-ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
April 12.....	H. R. Carscallen.....	15.0	7.82	0.697	1.39	5.45
May 6.....	".....	13.5	6.86	0.461	1.33	3.16
May 25.....	".....	13.3	6.24	0.473	1.30	2.95
June 10.....	R. G. Swan.....	13.5	5.60	0.352	1.28	1.97
July 6.....	".....	11.5	4.15	0.137	1.16	0.57
July 30.....	".....	11.0	3.70	0.108	1.10	0.40
August 18.....	".....	13.0	4.77	0.193	1.19	0.92
September 13.....	H. R. Carscallen.....	12.8	5.13	0.381	1.25	1.96
October 6.....	R. G. Swan.....	13.0	5.48	0.474	1.32	2.59
November 4.....	".....	10.8	4.97	0.470	1.31	2.34

DAILY GAUGE HEIGHT AND DISCHARGE of East Branch of Bear Creek at Johnson's Rancho,
for 1910.

DAY.	April.		May.		June.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	1.5	9.0	1.40	5.80	1.28	2.51
2.....	1.5	9.0	1.40	5.80	1.31	3.22
3.....	1.45	7.35	1.40	5.80	1.33	3.76
4.....	1.4	5.8	1.40	5.80	1.31	3.22
5.....	1.4	5.8	1.33	3.76	1.31	3.22
6.....	1.4	5.8	1.33	3.76	1.28	2.51
7.....	1.4	5.8	1.33	3.76	1.28	2.51
8.....	1.4	5.8	1.33	3.76	1.28	2.51
9.....	1.4	5.8	1.33	3.76	1.28	2.51
10.....	1.4	5.8	1.33	3.76	1.28	2.51
11.....	1.4	5.8	1.33	3.76	1.24	1.69
12.....	1.4	5.8	1.33	3.76	1.24	1.69
13.....	1.4	5.8	1.33	3.76	1.24	1.69
14.....	1.4	5.8	1.33	3.76	1.24	1.69
15.....	1.4	5.8	1.33	3.76	1.24	1.69
16.....	1.4	5.8	1.36	4.60	1.24	1.69
17.....	1.4	5.8	1.33	3.76	1.24	1.69
18.....	1.4	5.8	1.33	3.76	1.24	1.69
19.....	1.4	5.8	1.40	5.80	1.24	1.69
20.....	1.4	5.8	1.36	4.60	1.24	1.69
21.....	1.4	5.8	1.33	3.76	1.21	1.21
22.....	1.4	5.8	1.33	3.76	1.21	1.21
23.....	1.4	5.8	1.33	3.76	1.23	1.53
24.....	1.4	5.8	1.33	3.76	1.21	1.21
25.....	1.4	5.8	1.31	3.22	1.18	0.87
26.....	1.4	5.8	1.28	2.51	1.21	1.21
27.....	1.4	5.8	1.28	2.51	1.23	1.53
28.....	1.4	5.8	1.28	2.51	1.16	0.69
29.....	1.4	5.8	1.28	2.51	1.18	0.87
30.....	1.4	5.8	1.28	2.51	1.16	0.69
31.....			1.28	2.51		

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DAILY GAUGE HEIGHT AND DISCHARGE of East Branch of Bear Creek, at Johnson's Rancho,
for 1910.—*Concluded.*

DAY.	July.		August.		September.		October.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	1.16	0.69	1.17	0.78	1.23	1.53	1.28	2.51
2.....	1.18	0.87	1.11	0.44	1.21	1.21	1.28	2.51
3.....	1.18	0.87	1.06	0.28	1.20	1.05	1.28	2.51
4.....	1.18	0.87	1.06	0.28	1.20	1.05	1.32	3.49
5.....	1.18	0.87	1.08	0.34	1.29	2.73	1.33	3.76
6.....	1.17	0.78	1.20	1.05	1.38	5.20	1.34	4.03
7.....	1.15	0.60	1.18	0.87	1.38	5.20	1.34	4.03
8.....	1.17	0.78	1.18	0.87	1.36	4.60	1.33	3.76
9.....	1.18	0.87	1.16	0.69	1.34	4.03	1.30	2.95
10.....	1.20	1.05	1.13	0.52	1.28	2.51	1.24	1.69
11.....	1.25	1.85	1.13	0.52	1.26	2.07	1.26	2.07
12.....	1.19	0.96	1.13	0.52	1.25	1.85	1.26	2.07
13.....	1.15	0.60	1.17	0.78	1.25	1.85	1.27	2.29
14.....	1.10	0.40	1.18	0.87	1.25	1.85	1.29	2.73
15.....	1.10	0.40	1.19	0.96	1.25	1.85	1.29	2.73
16.....	1.10	0.40	1.17	0.78	1.25	1.85	1.27	2.29
17.....	1.10	0.40	1.16	0.69	1.24	1.69	1.26	2.07
18.....	1.10	0.40	1.16	0.69	1.24	1.69	1.30	2.95
19.....	1.10	0.40	1.15	0.60	1.25	1.85	1.31	3.22
20.....	1.10	0.40	1.11	0.44	1.25	1.85	1.31	3.22
21.....	1.10	0.40	1.09	0.37	1.25	1.85	1.31	3.22
22.....	1.15	0.60	1.08	0.34	1.25	1.85	1.30	2.95
23.....	1.21	1.21	1.13	0.52	1.25	1.85	1.30	2.95
24.....	1.15	0.60	1.18	0.87	1.30	2.95	1.30	2.95
25.....	1.10	0.40	1.23	1.53	1.30	2.95	1.34	4.03
26.....	1.10	0.40	1.21	1.21	1.30	2.95	1.31	3.22
27.....	1.10	0.40	1.20	1.05	1.28	2.51	1.30	2.95
28.....	1.15	0.60	1.20	1.05	1.28	2.51	1.30	2.95
29.....	1.21	1.21	1.20	1.05	1.28	2.51	1.30	2.95
30.....	1.10	0.40	1.21	1.21	1.28	2.51	1.30	2.95
31.....	1.10	0.40	1.22	1.37	.....	.....	1.30	2.95

MONTHLY DISCHARGE of East Branch of Bear Creek at Johnson's Ranche, for 1910.

Drainage area, 27 square miles.

Month.	Discharge in Second-Feet.				Run-Off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on Drainage area.	Total in acre-feet.
April.....	9.00	5.80	6.07	0.235	0.262	361
May.....	5.80	2.51	3.56	0.132	0.152	220
June.....	3.76	0.69	1.88	0.070	0.078	112
July.....	1.85	0.40	0.68	0.025	0.029	42
August.....	1.53	0.28	0.76	0.028	0.032	47
September.....	5.20	1.05	2.40	0.088	0.098	143
October.....	4.03	1.69	2.93	0.109	0.126	180
The period.....						1,105

WEST BRANCH OF BEAR CREEK AT BERTRAM'S RANCHE.

This station was established September 16, 1909, by H. R. Carscallen. It is located on Sec. 32, Tp. 10, Rge. 23, W. 3rd Mer., about a mile and a half north of Skibereen P. O. The station is about three hundred yards above the junction of this branch with the East branch of Bear Creek.

This channel is straight for 25 feet above and 15 feet below the station. Both banks are comparatively high and will overflow only in cases of extreme floods. The banks are free from brush at the station, but are heavily wooded immediately above and twenty feet below. The bed of the creek is composed of sand and coarse gravel. The current is moderate at the station, but becomes very swift twenty feet downstream.

The gauge, which is read once each day by Charles Bertram, is a plain staff, graduated to feet and hundredths, attached vertically to a post sunk in the bed of the stream at the left bank and firmly stayed to the bank. The gauge is referred to bench marks as follows:—(1) A spike-head in the top of the initial point stake on the left bank, marked B. M.; elevation 8.00 above the zero of the gauge. (2) A spike-head in the top of a pointed poplar stump just below the bank on the left side of the stream, and about 50 feet downstream from the gauge, the stump blazed and marked B. M.; elevation, 8.41 feet above the zero of the gauge.

Discharge measurements are made at, or a short distance below, the gauge by wading. High-water measurements are made at the government bridge, situated about three-quarters of a mile upstream. The initial point for soundings at the station is a square stake driven close to the ground on the left bank and marked I. P. o.o.

DISCHARGE MEASUREMENTS of West Branch of Bear Creek at Bertram's Ranche, in 1910.

DATE.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Dis-charge.
		<i>Feet.</i>	<i>Sq.-ft.</i>	<i>Ft. per sec.</i>	<i>Fest.</i>	<i>Sec.-ft.</i>
April 13.....	H. R. Carscallen.....	15.0	11.67	0.922	1.54	10.77
May 6.....	".....	17.4	10.26	0.521	1.42	5.35
May 25.....	".....	15.8	9.25	0.495	1.39	4.58
June 9.....	R. G. Swan.....	14.5	8.59	0.452	1.38	3.88
July 5.....	".....	14.6	7.39	0.273	1.32	2.02
July 29.....	".....	2.0	0.70	0.200	1.10	0.14
August 18.....	".....	12.4	6.01	0.361	1.31	2.17
September 13.....	H. R. Carscallen.....	14.3	8.25	0.321	1.37	2.65
October 6.....	R. G. Swan.....	14.5	8.72	0.556	1.42	4.85
November 4.....	".....		8.99	0.430	1.41	3.86

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DAILY GAUGE HEIGHT AND DISCHARGE of West Branch of Bear Creek
at Bertram's Rancho, for 1910.

DAY.	April.		May.		June.	
	Gauge Height.	Dis- charge.	Gauge Height.	Dis- charge.	Gauge Height.	Dis- charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	1.6	15.2	1.4	4.2	1.4	4.2
2.....	1.6	15.2	1.4	4.2	1.4	4.2
3.....	1.6	15.2	1.4	4.2	1.45	6.0
4.....	1.6	15.2	1.4	4.2	1.45	6.0
5.....	1.6	15.2	1.4	4.2	1.4	4.2
6.....	1.6	15.2	1.4	4.2	1.4	4.2
7.....	1.6	15.2	1.4	4.2	1.4	4.2
8.....	1.5	8.4	1.4	4.2	1.4	4.2
9.....	1.5	8.4	1.4	4.2	1.4	4.2
10.....	1.5	8.4	1.4	4.2	1.3	1.8
11.....	1.5	8.4	1.4	4.2	1.3	1.8
12.....	1.5	8.4	1.4	4.2	1.2	0.8
13.....	1.5	8.4	1.4	4.2	1.2	0.8
14.....	1.5	8.4	1.4	4.2	1.2	0.8
15.....	1.5	8.4	1.4	4.2	1.3	1.8
16.....	1.5	8.4	1.4	4.2	1.3	1.8
17.....	1.5	8.4	1.4	4.2	1.4	4.2
18.....	1.5	8.4	1.4	4.2	1.4	4.2
19.....	1.5	8.4	1.45	6.0	1.4	4.2
20.....	1.5	8.4	1.45	6.0	1.4	4.2
21.....	1.5	8.4	1.45	6.0	1.3	1.8
22.....	1.4	4.2	1.4	4.2	1.2	0.8
23.....	1.4	4.2	1.4	4.2	1.2	0.8
24.....	1.4	4.2	1.4	4.2	1.2	0.8
25.....	1.4	4.2	1.4	4.2	1.2	0.8
26.....	1.4	4.2	1.4	4.2	1.1	0.3
27.....	1.4	4.2	1.4	4.2	1.1	0.3
28.....	1.4	4.2	1.4	4.2	1.1	0.3
39.....	1.4	4.2	1.4	4.2	1.2	0.8
30.....	1.4	4.2	1.4	4.2	1.3	1.8
21.....	.....	.....	1.4	4.2	.....	.....

DAILY GAUGE HEIGHT AND DISCHARGE of West Branch of Bear Creek at
Bertram's Ranche, for 1910.—*Concluded.*

DAY.	July.		August.		September.		October.	
	Gauge Height.	Dis- charge.	Gauge Height.	Dis- charge.	Gauge Height.	Dis- charge.	Gauge Height.	Dis- charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	1.3	1.8	1.07	0.2	1.37	3.2	1.44	5.6
2.....	1.3	1.8	1.07	0.2	1.37	3.2	1.45	6.0
3.....	1.3	1.8	1.07	0.2	1.37	3.2	1.45	6.0
4.....	1.3	1.8	1.07	0.2	1.37	3.2	1.45	6.0
5.....	1.3	1.8	1.07	0.2	1.47	7.0	1.45	6.0
6.....	1.3	1.8	1.07	0.2	1.47	7.0	1.45	6.0
7.....	1.3	1.8	1.07	0.2	1.50	8.4	1.45	6.0
8.....	1.3	1.8	1.07	0.2	1.50	8.4	1.45	6.0
9.....	1.3	1.8	1.07	0.2	1.50	8.4	1.45	6.0
10.....	1.3	1.8	1.07	0.2	1.47	7.0	1.45	6.0
11.....	1.3	1.8	1.07	0.2	1.42	4.9	1.45	6.0
12.....	1.3	1.8	1.07	0.2	1.42	4.9	1.44	5.6
13.....	1.2	0.8	1.07	0.2	1.37	3.2	1.44	5.6
14.....	1.1	0.3	1.07	0.2	1.37	3.2	1.44	5.6
15.....	1.05	0.1	1.17	0.65	1.37	3.2	1.45	6.0
16.....	1.05	0.1	1.27	1.4	1.37	3.2	1.45	6.0
17.....	1.1	0.3	1.32	2.2	1.37	3.2	1.45	6.0
18.....	1.2	0.8	1.32	2.2	1.37	3.2	1.45	6.0
19.....	1.2	0.8	1.32	2.2	1.37	3.2	1.45	6.0
20.....	1.2	0.8	1.32	2.2	1.37	3.2	1.45	6.0
21.....	1.3	1.8	1.32	2.2	1.37	3.2	1.45	6.0
22.....	1.3	1.8	1.32	2.2	1.37	3.2	1.45	6.0
23.....	1.2	0.8	1.32	2.2	1.42	4.9	1.46	6.5
24.....	1.1	0.3	1.32	2.2	1.42	4.9	1.47	7.0
25.....	1.1	0.3	1.32	2.2	1.43	5.3	1.52	9.6
26.....	1.1	0.3	1.32	2.2	1.43	5.3	1.52	9.6
27.....	1.1	0.3	1.32	2.2	1.44	5.6	1.52	9.6
28.....	1.1	0.3	1.32	2.2	1.44	5.6	1.47	7.0
29.....	1.1	0.3	1.32	2.2	1.44	5.6	1.47	7.0
30.....	1.1	0.3	1.32	2.2	1.44	5.6	1.47	7.0
31.....	1.1	0.3	1.32	2.2	1.47	7.0

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MONTHLY DISCHARGE of West Branch of Bear Creek at Bertram's Rancho, for 1910.

Drainage area, 44.5 square miles.

Month.	Discharge in Second-Feet.				Run-Off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on Drainage area.	Total in acre-feet.
April.....	15.2	4.2	8.73	0.196	0.219	519
May.....	6.0	4.2	4.37	0.098	0.113	269
June.....	6.0	0.3	2.54	0.057	0.064	151
July.....	1.8	0.3	1.05	0.023	0.026	64
August.....	2.2	0.2	1.22	0.027	0.031	75
September.....	8.4	3.2	4.79	0.108	0.120	285
October.....	9.6	5.6	6.47	0.146	0.168	398
The period.....						1,761

BEAR CREEK, NEAR UNSWORTH'S RANCHE.

This station was established June 22, 1908, by F. T. Fletcher. It is located on Sec. 18, Tp. 11, Rge. 23, W. 3rd Mer., at the highway bridge on the surveyed trail running east from Maple Creek. It is about one-half mile south of S. Unsworth's ranche, and fifteen miles east of Maple Creek.

The channel is straight for 100 feet above and below the station. Both banks are high and not liable to overflow. The station is kept clear of underbrush, but both banks are covered with small trees above and below the bridge. The bed of the stream is sandy and is liable to change at high stages of the creek. The current is moderate, becoming sluggish at very low stages.

The gauge, which is read once each day by Mr. Unsworth, is a plain staff, graduated to feet and hundredths, attached vertically to the centre pile on the downstream side of the bridge. It is referred to bench marks as follows:—(1) A circle of nail-heads in the top of the stringer at the left abutment on the downstream side of the bridge; elevation, 14.05 feet above the zero of the gauge. (2) The top of the iron pin in the road mound southeast of the bridge on the left bank; elevation, 18.97 feet above the zero of the gauge.

Discharge measurements are made from the downstream side of the bridge. The initial point for soundings is the inner face of the left abutment of the bridge. Low-water measurements are made at a wading section about one-half mile downstream from the gauge. There is only one channel at low stages, but at high stages the centre row of piles supporting the bridge divides the stream into two channels.

DISCHARGE MEASUREMENTS of Bear Creek at Unsworth's Rancho, in 1910.

DATE.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Dis-charge.
		<i>Feet.</i>	<i>Sq.-ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
April 12.....	H. R. Carscallen.....	9.0	21.10	0.852	1.79	17.98
May 6.....	".....	9.0	17.15	0.588	1.23	10.09
May 24.....	".....	9.0	17.27	0.511	1.15	8.83
June 9.....	R. G. Swan.....	7.9	13.66	0.476	1.01	6.50
June 11.....	R. J. Burley.....	8.0	7.75	0.584	0.86	4.53
June 16.....	".....	7.8	6.55	0.474	0.75	3.10
July 5.....	R. G. Swan.....	7.4	9.50	0.202	0.58	1.92
July 29.....	".....	8.0	7.82	0.004	0.14	0.04*
August 18.....	".....	8.0	7.68	0.202	0.45	1.55
September 13.....	".....	8.5	11.71	0.263	0.72	3.08
October 6.....	".....	9.5	17.70	0.382	1.06	6.75
November 4.....	".....	9.5	17.80	0.348	1.07	6.20

*Discharge determined by using a 15-inch weir.

DAILY GAUGE HEIGHT AND DISCHARGE of Bear Creek, near Unsworth's Ranche, for 1910.

DAY.	April.		May.		June.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge. Height	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	1.9	19.1	1.4	11.0	1.1	7.1
2.....	1.9	19.1	1.4	11.0	1.1	7.1
3.....	1.9	19.1	1.3	9.6	1.1	7.1
4.....	1.8	17.4	1.3	9.6	1.2	8.3
5.....	1.8	17.4	1.3	9.6	1.2	8.3
6.....	1.9	19.1	1.2	8.3	1.1	7.1
7.....	1.9	19.1	1.2	8.3	1.1	7.1
8.....	1.9	19.1	1.2	8.3	1.0	6.0
9.....	1.9	19.1	1.2	8.3	1.0	6.0
10.....	1.9	19.1	1.2	8.3	0.9	5.0
11.....	1.9	19.1	1.2	8.3	0.9	5.0
12.....	1.8	17.4	1.2	8.3	0.9	5.0
13.....	1.8	17.4	1.2	8.3	0.8	4.0
14.....	1.8	17.4	1.2	8.3	0.8	4.0
15.....	1.8	17.4	1.2	8.3	0.7	3.1
16.....	1.8	17.4	1.3	9.6	0.7	3.1
17.....	1.8	17.4	1.3	9.6	0.8	4.0
18.....	1.8	17.4	1.3	9.6	1.0	6.0
19.....	1.8	17.4	1.3	9.6	0.9	5.0
20.....	1.7	15.7	1.3	9.6	0.9	5.0
21.....	1.7	15.7	1.2	8.3	0.8	4.0
22.....	1.7	15.7	1.2	8.3	0.8	4.0
23.....	1.6	14.1	1.2	8.3	0.7	3.1
24.....	1.6	14.1	1.1	7.1	0.7	3.1
25.....	1.6	14.1	1.1	7.1	0.7	3.1
26.....	1.5	12.5	1.1	7.1	0.7	3.1
27.....	1.5	12.5	1.1	7.1	0.6	2.3
28.....	1.5	12.5	1.1	7.1	0.6	2.3
29.....	1.5	12.5	1.1	7.1	0.6	2.3
30.....	1.5	12.5	1.1	7.1	0.6	2.3
31.....			1.1	7.1		

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DAILY GAUGE HEIGHT AND DISCHARGE of Bear Creek, near Unsworth's Rancho, for 1910.—*Con.*

DAY.	July.		August.		September.		October.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	0.6	2.3	0.3	0.5	0.47	1.4	1.05	6.55
2.....	0.6	2.3	0.3	0.5	0.47	1.4	1.05	6.55
3.....	0.7	3.1	0.27	0.4	0.47	1.4	1.08	6.90
4.....	0.7	3.1	0.27	0.4	0.47	1.4	1.1	7.10
5.....	0.7	3.1	0.25	0.35	0.5	1.6	1.08	6.90
6.....	0.7	3.1	0.30	0.50	0.6	2.3	1.05	6.55
7.....	0.6	2.3	0.30	0.50	0.85	4.5	1.05	6.55
8.....	0.6	2.3	0.32	0.60	0.85	4.5	1.05	6.55
9.....	0.6	2.3	0.32	0.60	0.85	4.5	1.03	6.30
10.....	0.6	2.3	0.32	0.60	0.8	4.0	1.03	6.30
11.....	0.7	3.1	0.32	0.60	0.8	4.0	1.02	6.20
12.....	0.7	3.1	0.35	0.75	0.78	3.8	1.0	6.00
13.....	0.6	2.3	0.35	0.75	0.78	3.8	1.0	6.00
14.....	0.6	2.3	0.37	0.85	0.75	3.5	1.0	6.00
15.....	0.6	2.3	0.40	1.00	0.75	3.5	1.0	6.00
16.....	0.5	1.6	0.45	1.30	0.75	3.5	1.0	6.00
17.....	0.4	1.0	0.50	1.60	0.75	3.5	1.0	6.00
18.....	0.4	1.0	0.50	1.60	0.75	3.5	1.0	6.00
19.....	0.3	0.5	0.47	1.40	0.77	3.7	1.0	6.00
20.....	0.3	0.5	0.45	1.30	0.8	4.0	1.03	6.30
21.....	0.2	0.2	0.45	1.30	0.8	4.0	1.03	6.30
22.....	0.2	0.2	0.45	1.30	0.8	4.0	1.05	6.55
23.....	0.2	0.2	0.45	1.30	0.8	4.0	1.05	6.55
24.....	0.2	0.2	0.47	1.40	0.82	4.2	1.05	6.55
25.....	0.3	0.5	0.50	1.60	0.85	4.5	1.07	6.80
26.....	0.3	0.5	0.50	1.60	0.87	4.7	1.07	6.80
27.....	0.3	0.5	0.50	1.60	0.90	5.0	1.08	6.90
28.....	0.2	0.2	0.50	1.60	0.95	5.5	1.1	7.10
29.....	0.15	0.1	0.50	1.60	1.00	6.0	1.1	7.10
30.....	0.15	0.1	0.50	1.60	1.02	6.2	1.1	7.10
31.....	0.12	0.04	0.50	1.60	.....	.....	1.1	7.10

MONTHLY DISCHARGE of West Branch of Bear Creek at Unsworth's Ranche, for 1910.

Drainage area, 95 square miles.

Month.	Discharge in Second-Feet.				Run-Off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on Drainage area.	Total in acre-feet.
April.....	19.1	12.50	16.59	0.175	0.195	985
May.....	11.0	7.10	8.50	0.089	0.103	522
June.....	8.3	2.30	4.76	0.050	0.056	283
July.....	3.1	0.01	1.50	0.015	0.017	92
August.....	1.6	0.35	1.05	0.011	0.013	65
September.....	6.2	1.40	3.73	0.039	0.044	222
October.....	7.1	6.00	6.50	0.068	0.078	400
The period.....						2,569

PIAPOT CREEK AT CUMBERLAND'S RANCHE.

This station was established June 17, 1908, by F. T. Fletcher. It was located on Sec. 17, Tp. 11, Rge. 24, W. 3rd Mer., at the highway bridge on the surveyed trail running east of Maple Creek and about nine miles from Maple Creek. This station, on account of the difficulty of obtaining an observer, was abandoned May 13, 1909, and re-established by H. R. Carscallen at a wading section near A. Cumberland's house. It is located about a mile north of the old station on Sec. 18, Tp. 11, Rge. 24, W. 3rd Mer.

The channel is straight for 50 feet above and 100 feet below the station. The right bank is high and not liable to overflow; the left bank is comparatively low and will overflow at flood stages of the stream. The bed of the stream is composed of sand and may shift during high stages. The current is sluggish.

The gauge, which is read by Mr. Cumberland, is a plain staff graduated to feet and hundredths, attached vertically to a post sunk in the bed of the stream at the left bank and securely stayed to the bank. It is referred to bench marks as follows:—(1) The top of two spikes driven horizontally into the end of a log at the southwest corner of Mr. Cumberland's old house; elevation, 12.72 above the zero of the gauge. (2) A spike-head surrounded by a circle of nail-heads in the top of a log at the north-west corner of the out-building south of Mr. Cumberland's house; elevation, 11.70 feet above the zero of the gauge.

Discharge measurements are made at or near the gauge by wading. High-water measurements are made at the first established station, from the downstream side of the bridge. The initial point for soundings is the inner face of left abutment of the bridge. Owing to a centre row of piles, there are two channels at high water.

DISCHARGE MEASUREMENTS of Piapot Creek at Cumberland's Ranche, in 1910.

DATE	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Dis-charge.
		<i>Feet.</i>	<i>Sq.-ft.</i>	<i>Ft. per sec.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>
April 11.....	H. R. Carscallen.....	11.6	11.12	0.777	1.48	8.64
May 6.....	".....	11.3	6.16	0.364	1.07	2.24
May 24.....	".....	11.6	6.15	0.328	1.07	2.02
June 9.....	R. G. Swan.....	11.4	6.13	0.212	1.03	1.30
July 4.....	".....	11.7	6.70	0.148	1.01	0.99
July 28.....	".....	11.7	5.40	0.053	0.92	0.28*
August 17.....	".....	11.8	5.51	0.102	1.05	0.56*
September 12.....	H. R. Carscallen.....	11.5	6.46	0.084	1.06	0.54*
October 5.....	R. G. Swan.....	11.1	6.42	0.140	1.05	0.90
November 3.....	".....	11.3	6.40	0.176	1.05	1.13

* Discharge determined by using a 15-inch weir.

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DAILY GAUGE HEIGHT AND DISCHARGE of Piapot Creek at Cumberland's Ranche, for 1910.

DAY.	April.		May.		June.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	1.43	7.31	1.13	1.64	0.98	0.49
2.....	1.43	7.31	1.13	1.64	1.03	0.77
3.....	1.43	7.31	1.13	1.64	1.08	1.15
4.....	1.43	7.31	1.08	1.15	1.13	1.64
5.....	1.43	7.31	1.08	1.15	0.93	0.29
6.....	1.43	7.31	1.08	1.15	1.03	0.77
7.....	1.43	7.31	1.03	0.77	1.03	0.77
8.....	1.43	7.31	1.03	0.77	1.03	0.77
9.....	1.43	7.31	1.03	0.77	1.03	0.77
10.....	1.43	7.31	1.03	0.77	1.03	0.77
11.....	1.43	7.31	0.98	0.49	0.93	0.29
12.....	1.43	7.31	0.98	0.49	0.93	0.29
13.....	1.43	7.31	0.98	0.49	0.83	0.07
14.....	1.23	2.97	0.98	0.49	0.83	0.07
15.....	1.23	2.97	1.13	1.64	1.03	0.77
16.....	1.23	2.97	1.13	1.64	1.03	0.77
17.....	1.18	2.24	1.08	1.15	1.13	1.64
18.....	1.13	1.64	1.03	0.77	1.13	1.64
19.....	1.13	1.64	1.08	1.15	1.13	1.64
20.....	1.13	1.64	1.13	1.64	1.03	0.77
21.....	1.13	1.64	1.13	1.64	1.03	0.77
22.....	1.13	1.64	1.13	1.64	1.03	0.77
23.....	1.13	1.64	1.08	1.15	1.03	0.77
24.....	1.13	1.64	1.08	1.15	1.03	0.77
25.....	1.13	1.64	1.03	0.77	1.03	0.77
26.....	1.13	1.64	1.03	0.77	1.03	0.77
27.....	1.13	1.64	1.03	0.77	1.03	0.77
28.....	1.13	1.64	1.03	0.77	1.03	0.77
29.....	1.13	1.64	1.03	0.77	0.98	0.49
30.....	1.13	1.64	1.03	0.77	1.03	0.77
31.....			1.03	0.77		

DAILY GAUGE HEIGHT AND DISCHARGE of Piapot Creek, at Cumberland's Ranche, for 1910.—*Con.*

DAY.	July.		August.		September.		October.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	1.03 }	0.77	0.93	0.29	1.01	0.64	1.05	0.90
2.....	1.03	0.77	0.93	0.29	1.02	0.71	1.03	0.77
3.....	1.03 }	0.77	0.93	0.29	1.02	0.71	1.04	0.84
4.....	1.03	0.77	0.94	0.32	1.07	1.07	1.06	0.98
5.....	1.03 }	0.77	1.03	0.77	1.08	1.15	1.06	0.98
6.....	1.03	0.77	1.01	0.64	1.06	0.98	1.05	0.90
7.....	1.03	0.77	1.01	0.64	1.18	2.24	1.04	0.84
8.....	1.03	0.77	1.00	0.58	1.13	1.64	1.04	0.84
9.....	1.03	0.77	0.99	0.53	1.12	1.53	1.03	0.77
10.....	1.13	1.64	1.01	0.64	1.06	0.98	1.03	0.77
11.....	1.13	1.64	1.00	0.58	1.05	0.90	1.04	0.84
12.....	1.03	0.77	0.99	0.53	1.06	0.98	1.05	0.90
13.....	1.03	0.77	1.02	0.71	1.06	0.98	1.04	0.84
14.....	0.98	0.49	1.04	0.84	1.05	0.90	1.03	0.77
15.....	0.93	0.29	1.08	1.15	1.05	0.90	1.03	0.77
16.....	1.03	0.77	1.08	1.15	1.03	0.77	1.03	0.77
17.....	1.03	0.77	1.05	0.90	1.03	0.77	1.03	0.77
18.....	1.03	0.77	1.05	0.90	1.03	0.77	1.06	0.98
19.....	1.03	0.77	1.04	0.84	1.03	0.77	1.04	0.84
20.....	0.93	0.29	1.03	0.77	1.02	0.71	1.03	0.77
21.....	0.93	0.29	1.02	0.71	1.02	0.71	1.03	0.77
22.....	0.93	0.29	1.01	0.64	1.03	0.77	1.03	0.77
23.....	1.03	0.77	1.06	0.98	1.03	0.77	1.04	0.84
24.....	1.03	0.77	1.08	1.15	1.04	0.84	1.04	0.84
25.....	0.93	0.29	1.08	1.15	1.07	1.07	1.12	1.53
26.....	0.93	0.29	1.07	1.07	1.08	1.15	1.07	1.07
27.....	0.93	0.29	1.05	0.90	1.06	0.98	1.08	1.15
28.....	0.88	0.16	1.03	0.77	1.05	0.90	1.06	0.98
29.....	0.93	0.29	1.03	0.77	1.04	0.84	1.05	0.90
30.....	0.93	0.29	1.07	1.07	1.03	0.77	1.03	0.77
31.....	0.93	0.29	1.08	1.15	1.10	1.32

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MONTHLY DISCHARGE of Piapot Creek at Cumberland's Ranche, in 1910.

Drainage area, 50 square miles.

Month.	Discharge in Second-Feet.				Run-Off.	
	Maximum.	Minimum.	Mean.	Per square mie.	Depth in inches on Drainage area.	Total in acre-feet.
April.....	7.31	1.64	4.25	0.0850	0.0948	253
May.....	1.64	0.49	1.04	0.0208	0.0240	64
June.....	1.64	0.07	0.78	0.0156	0.0174	46
July.....	1.64	0.16	0.64	0.0128	0.0148	39
August.....	1.15	0.29	0.77	0.0154	0.0177	47
September.....	2.24	0.64	0.96	0.0192	0.0214	57
October.....	1.53	0.77	0.90	0.0180	0.0207	55
The period.....						561

MISCELLANEOUS DISCHARGE MEASUREMENTS of Crane Lake Drainage Basin, in 1910.

DATE	Stream.	Locality.	Hydrographer.	Width.	Area of Section.	Dis- charge.
June 4.....	BearCreek,E.Branch	N.E. 29-10-23-3...	R. J. Burley.....	12.7	7.5	3.97
June 6.....	"	" ..	" ..	11.0	4.46	1.88
June 6.....	"	" ..	" ..	6.0	2.32	2.60
June 14.....	"	" ..	" ..	4.7	1.96	1.31
June 4.....	Bear C'k.,W.Branch	N.W. 29-10-23-3..	" ..	14.3	11.5	5.65
June 6.....	"	" ..	" ..	12.0	4.84	4.29
June 14.....	"	" ..	" ..	% 6.5	2.48	2.19
June 14.....	"	" ..	" ..	† 7.2	3.7	2.22
June 11.....	Creek (Spring)....	N.W. 5-11-23-3...	" ..	.....	.....	0.38
June 5.....	Glennie's Creek...	S.W. 25-10-24-3...	" ..	* .....	.....	0.42
June 5.....	Piapot Creek.....	N.E. 25-10-25-3...	" ..	9.2	2.9	0.82

% At rapids.
† At slow current.
* Weir measurements.

HAY LAKE DRAINAGE BASIN.

General Description.

Hay Lake is quite small, covering only an approximate area of 3 square miles. It is situated in Tp. 11, Rge. 25, W. 3rd Mer., and like most of the lakes in the surrounding district, it has no surface outlet. Its source of supply is Hay Creek. This creek rises in the Cypress Hills and follows a northerly course to the lake. The basin supplies water to a number of irrigation schemes and also supplies the domestic water supply for the town of Maple Creek.

The annual precipitation, is about 12 inches, falling during May, June and July.

HAY CREEK AT FAUQUIER'S RANCHE.

This station was established April 22, 1909, by F. T. Fletcher. It is located on Sec. 30, Tp. 10, Rge. 25, W. 3rd Mer., about 7 miles southeast of Maple Creek.

The channel is straight for 100 feet above and 200 feet below the station. Both banks are high at the station and not liable to overflow. The bed of the stream is composed of sand and coarse gravel and is liable to shift at high stages. The current is sluggish at the gauge in low water, but is swift at high stages.

Discharge measurements are made near the regular station by wading and at very low stages a weir is used. The initial point for soundings is a square stake driven close to the ground on the left bank, marked I. P. o.o. High-water measurements cannot be obtained owing to the absence of any structure from which to gauge the stream. The gauge was at first located below the intake of the Maple Creek Waterworks and of H. Fauquier's irrigation canal and records of flow obtained at the gauge do not include this diverted water and do not represent the total discharge of the stream. Below the intake of the Waterworks there is a continuous flow for a short distance kept up mainly by the overflow from the Waterworks Reservoir. This flow does not reach the gauge, being partly used up by H. Fauquier's irrigation ditch and the rest disappearing as seepage. As a consequence of this, the creek at the gauge was dry from the 4th April, throughout the whole of the season of 1910.

In the endeavour to obtain records of the flow above the intake of Mr. Fauquier's ditch and below the overflow of the Maple Creek Waterworks Reservoir a gauge was established on July 4th by R. G. Swan, on Sec. 29, Tp. 10, Rge. 25, W. 3rd Mer. It is about 200 yards above the headgate of Mr. Fauquier's irrigation ditch and 300 yards below the overflow of the Maple Creek Waterworks Reservoir.

The gauge, which is a plain staff, graduated to feet and hundredths, is securely fastened to a post sunk in the bed of the stream near the right bank and stayed. It is referred to two bench marks as follows:—(1) A spike driven in the southeast corner of a house, 300 feet west of the gauge and marked B. M.; elevation, 8.32 above the datum of the gauge. (2) A spike in the base of a willow stump, about 75 feet south of the rod and marked B. M.; elevation, 4.96 above the datum of the gauge.

The channel of the creek is slightly curved for about 8 feet above and 50 feet below the rod. The channel bed is sandy, covered with vegetation and liable to shift. The current is sluggish. Both banks are low and liable to overflow.

Discharge measurements are made with meter at ordinary stages and with a weir at low stages. The discharge at this station being dependent upon the overflow from the Maple Creek Waterworks Reservoir varied according to the consumption of water in the town of Maple Creek. Hence, since the gauge was read only once each day accurate results could not be obtained.

The gauge was read during 1910, by H. A. Symonds.

DISCHARGE MEASUREMENTS of Hay Creek at Fauquier's Ranche, in 1910.

DATE.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Dis-charge.
		<i>Feet.</i>	<i>Sq.-ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
May 26.....	R. J. Burley.....					0.20*
May 28.....	".....					Nil.
May 30.....	".....					0.29*
August 15.....	R. G. Swan.....				0.995	0.01*
September 3.....	".....				0.990	0.04*
September 12.....	H. R. Carscallen.....				0.990	0.04*

* Discharge determined by using a 15-inch weir.

DAILY GAUGE HEIGHT of Hay Creek at Fauquier's Ranche, for 1910.

DAY.	July.		August.		September.		October.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>		<i>Feet.</i>		<i>Feet.</i>		<i>Feet.</i>	
1.....			0.0		0.9		0.0	
2.....			0.0		1.0			
3.....	0.9		0.0		1.0			
4.....	1.0		0.0		1.0			
5.....	0.9		0.9		1.0			
6.....	0.9		1.0		1.0			
7.....	0.8		0.9		1.0			
8.....	0.9		0.9		1.0			
9.....	1.0		0.9		1.0			
10.....	1.0		0.9		1.0			
11.....	0.9		0.9		1.0			
12.....	0.9		0.9		1.0			
13.....	1.0		0.9		1.0			
14.....	0.9		1.0		1.0			
15.....	0.8		1.0		1.0			
16.....	0.9		0.9		0.9			
17.....	0.9		0.9		0.98			
18.....	1.0		1.0		1.0			
19.....	1.0		1.0		0.99			
20.....	0.9		0.9		0.97			
21.....	1.0		*0.0		0.90			
22.....	1.0		0.0		0.94			
23.....	1.0		0.9		0.89			
24.....	1.0		0.9		0.89			
25.....	1.0		1.0		0.88			
26.....	1.0		0.9		0.87			
27.....	1.0		*0.0		0.87			
28.....	1.0		0.0		*0.0			
29.....	0.9		0.0		0.0			
30.....	1.0		0.0		0.0			
31.....	*0.0		0.0					

* Creek dry, July 31-Aug. 4, Aug. 21-22, Aug. 27-31, Sept. 28-Oct. 31.

BIGSTICK LAKE DRAINAGE BASIN.

This lake is one of the largest in the northern Cypress Hills district. It is situated in Tp. 15, Rge. 25, W. 3rd Mer., covers an area of 35 square miles, is alkaline in character and has no surface outlet.

Maple Creek, which rises in the Cypress Hills, with its tributary, Gap Creek, is its only source of supply. On the south and east the lake is bounded by the Sand Hills.

The valley of Maple Creek is quite flat and shallow, and the surrounding bench land is gentle rolling prairie.

The annual precipitation is about 12 inches, and falls during May, June and July.

There are several small irrigation ditches in the basin.

MAPLE CREEK AT MAPLE CREEK.

This station was established May 9, 1908, by R. J. Burley. It is located at the highway bridge just north of the C. P. Railway tracks in the town of Maple Creek.

The channel is straight for 200 feet above and 100 feet below the station. Both banks are comparatively low and will overflow at high-water stages of the stream. The bed of the stream is composed of sand and may shift during flood stages. The current is moderate at high and sluggish at low stages of the stream. The bridge is not at right angles to the flow and measurements made at the bridge must be corrected.

The gauge is a plain staff, graduated to feet and hundredths, attached vertically to a pile on the upstream side of the bridge, is referred to bench marks as follows:—(1) A spike-head in the top of a small pile on the right bank at the upstream side of the bridge; elevation, 8.04 feet above the zero of the gauge. (2) Nail-heads in the top of the stringer at the right abutment on the upstream side of the bridge; elevation, 8.14 feet above the zero of the gauge. (3) An “arrow-head” painted in black on the top of a long pile in the bed of the creek near the left bank and on the upstream side of the bridge; elevation, 8.64 feet above the zero of the gauge. It was read until Aug. 20, 1910, by C. A. Peterson, and after that by Thos. McMurdo.

Discharge measurements are made from the downstream side of the bridge. The initial point for sounding is the inner face of the right or south abutment of the bridge. Low-water measurements are made at a point about 50 feet upstream from the gauge by wading, and at very low stages a weir is used. The light, sandy soil of the banks gives rise to a great amount of erosion during flood stages, and this fact, coupled with that of the low banks of the stream, makes this station a rather unsatisfactory one for gauging purposes.

DISCHARGE MEASUREMENTS of Maple Creek at Maple Creek, in 1910.

DATE	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Dis-charge.
		<i>Feet.</i>	<i>Sq.-ft.</i>	<i>Fl. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
April 2.....	H. R. Carscallen.....	8.5	4.73	0.596	1.16	2.82
April 29.....	".....				0.84	0.17*
May 4.....	".....				0.84	0.15*
May 21.....	".....				0.83	0.18*
June 6.....	R. G. Swan.....				0.84	0.21*
June 25.....	".....				0.82	0.18*
July 25.....	".....					Nil. †
September 6.....	".....				0.75	Nil.
August 16.....	".....				0.74	Nil.

* Discharge determined by using a 15-inch weir
† Creek dry July 11-Aug. 11, Aug. 16-Sept. 4, Sept. 8-Oct. 31.

DAILY GAUGE HEIGHT AND DISCHARGE of Maple Creek, at Maple Creek, for 1910.

DAY.	April.		May.		June.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	1.15	2.60	0.85	0.22	0.80	0.09
2.....	1.15	2.60	0.85	0.22	0.85	0.22
3.....	1.15	2.60	0.85	0.22	0.85	0.22
4.....	1.10	1.85	0.85	0.22	0.85	0.22
5.....	1.10	1.85	0.85	0.22	0.85	0.22
6.....	1.10	1.85	0.85	0.22	0.85	0.22
7.....	1.10	1.85	0.85	0.22	0.85	0.22
8.....	1.05	1.33	0.85	0.22	0.85	0.22
9.....	1.05	1.33	0.85	0.22	0.85	0.22
10.....	1.05	1.33	0.85	0.22	0.85	0.22
11.....	1.00	0.94	0.85	0.22	0.80	0.09
12.....	1.00	0.94	0.85	0.22	0.80	0.09
13.....	1.00	0.94	0.85	0.22	0.80	0.09
14.....	1.00	0.94	0.85	0.22	0.80	0.09
15.....	1.00	0.94	0.85	0.22	0.80	0.09
16.....	0.95	0.62	0.85	0.22	0.80	0.09
17.....	0.95	0.62	0.85	0.22	0.80	0.09
18.....	0.95	0.62	0.85	0.22	0.80	0.09
19.....	0.95	0.62	0.85	0.22	0.80	0.09
20.....	0.95	0.62	0.85	0.22	0.80	0.09
21.....	0.90	0.38	0.85	0.22	0.80	0.09
22.....	0.90	0.38	0.80	0.09	0.80	0.09
23.....	0.90	0.38	0.80	0.09	0.80	0.09
24.....	0.85	0.22	0.80	0.09	0.80	0.09
25.....	0.85	0.22	0.80	0.09	0.80	0.09
26.....	0.85	0.22	0.80	0.09	0.80	0.09
27.....	0.85	0.22	0.80	0.09	0.80	0.09
28.....	0.85	0.22	0.80	0.09	0.80	0.09
29.....	0.85	0.22	0.80	0.09	0.80	0.09
30.....	0.85	0.22	0.80	0.09	0.80	0.09
31.....			0.80	0.09		

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DAILY GAUGE HEIGHT AND DISCHARGE of Maple Creek at Maple Creek, for 1910.—*Concluded.*

DAY.	July.		August.		September.		October.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	0.80	0.09	0.40	.....	0.65	.....	0.69	.....
2.....	0.80	0.09	0.40	.....	0.65	.....	0.69	.....
3.....	0.80	0.09	0.40	.....	0.65	.....	0.69	.....
4.....	0.80	0.09	0.50	.....	0.75	.....	0.69	.....
5.....	0.80	0.09	0.60	.....	0.80	0.09	0.69	.....
6.....	0.80	0.09	0.65	.....	0.80	0.09	0.68	.....
7.....	0.80	0.09	0.65	.....	0.80	0.09	0.68	.....
8.....	0.80	0.09	0.65	.....	0.75	*	0.67	.....
9.....	0.80	0.09	0.65	.....	0.75	.....	0.66	.....
10.....	0.80	0.09	0.65	.....	0.75	.....	0.65	.....
11.....	0.75	*	0.65	.....	0.75	.....	0.64	.....
12.....	0.75	.....	0.80	0.09	0.75	.....	0.63	.....
13.....	0.70	.....	0.85	0.22	0.75	.....	0.63	.....
14.....	0.70	.....	0.85	0.22	0.74	.....	0.62	.....
15.....	0.70	.....	0.80	0.09	0.73	.....	0.61	.....
16.....	0.65	.....	0.75	*	0.73	.....	0.60	.....
17.....	0.65	.....	0.75	.....	0.73	.....	0.59	.....
18.....	0.65	.....	0.75	.....	0.72	.....	0.59	.....
19.....	0.65	.....	0.70	.....	0.71	.....	0.59	.....
20.....	0.65	.....	0.60	.....	0.71	.....	0.59	.....
21.....	0.65	.....	0.50	.....	0.71	.....	0.59	.....
22.....	0.65	.....	0.40	.....	0.71	.....	0.59	.....
23.....	0.65	.....	0.70	.....	0.71	.....	0.59	.....
24.....	0.65	.....	0.65	.....	0.71	.....	0.64	.....
25.....	0.65	.....	0.65	.....	0.70	.....	0.64	.....
26.....	0.60	.....	0.60	.....	0.70	.....	0.63	.....
27.....	0.55	.....	0.60	.....	0.70	.....	0.63	.....
28.....	0.55	.....	0.65	.....	0.70	.....	0.63	.....
29.....	0.50	.....	0.65	.....	0.70	.....	0.62	.....
30.....	0.45	.....	0.65	.....	0.70	.....	0.62	.....
31.....	0.45	.....	0.70	.....	.....	.....	0.68	.....

* Creek dry July 11-Aug. 11, Aug. 16-Sept. 4, Sept. 8-Oct. 31.

MONTHLY DISCHARGE of Maple Creek at Maple Creek, for 1910.

Drainage area, 91 square miles.

Month.	Discharge in Second-Feet.				Run-Off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on Drainage area.	Total in acre-feet.
April.....	2.60	0.22	0.99	0.011	0.012	59
May.....	0.22	0.09	0.18	0.002	0.002	11
June.....	0.22	0.09	0.13	0.001	0.001	8
July.....	0.09	0.00	0.03	0.0003	0.0003	2
August.....	0.22	0.00	0.02	0.0002	0.0002	1
September.....	0.09	0.00	0.01	0.0001	0.0001	0.5
The period.....						81.5

MAPLE CREEK, NEAR MAPLE CREEK.

This station was established on May 4, 1910, by H. R. Carscallen. It is one mile north of the town of Maple Creek, on the bridge between Secs. 27 and 28, Tp. 11, Rge. 16, W. 3rd Mer. The channel is straight for a distance of 100 feet upstream and 10 feet downstream. The right bank is high and sandy. The left is low with a gradual slope and liable to overflow. The stream bed is sandy and liable to shift. The gauge, which was read daily during 1910 by C. A. Peterson, is a plain staff, graduated to feet and hundredths, securely fastened to the downstream side of the second pile from the right abutment. It is referred to two bench marks:—(1) Two spikes in the downstream side of the plank wing at the right abutment, marked B. M.; elevation, 9.37. (2) A spike-head in a five-inch post on the right bank, 35 feet west of the gauge and marked B.M.; elevation, 9.42.

DISCHARGE MEASUREMENTS of Maple Creek near Maple Creek, in 1910.

DATE	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Dis-charge.
		<i>Feet.</i>	<i>Sq.-ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
May 4.....	H. R. Carscallen.....				2.36	0.31]
May 21.....	".....	28.0	41.96	0.005	2.38	0.21
June 7.....	".....	27.0	45.22	0.004	2.35	0.18]
June 27.....	R. G. Swan.....	25.0	41.90	0.002	2.35	0.08
July 25.....	".....				2.35	0.06]
August 16.....	".....				2.51	0.09]
September 6.....	".....				2.49	0.11]
September 23.....	".....				2.44	0.03]
November 1.....	".....				2.50	0.11]

Discharges determined by using a 15-inch weir.

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DAILY GAUGE HEIGHT of Maple Creek near Maple Creek, for 1910

DAY.	May.		June.		July.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>		<i>Feet.</i>		<i>Feet.</i>	
1.....			2.35		2.40	
2.....			2.35		2.35	
3.....			2.35		2.35	
4.....	2.3		2.30		2.35	
5.....	2.35		2.30		2.35	
6.....	2.35		2.30		2.35	
7.....	2.35		2.30		2.35	
8.....	2.30		2.30		2.35	
9.....	2.30		2.30		2.35	
10.....	2.30		2.30		2.35	
11.....	2.35		2.50		2.35	
12.....	2.35		2.30		2.35	
13.....	2.35		2.30		2.35	
14.....	2.35		2.30		2.35	
15.....	2.35		2.30		2.35	
16.....	2.40		2.30		2.35	
17.....	2.40		2.35		2.35	
18.....	2.40		2.35		2.35	
19.....	2.45		2.35		2.35	
20.....	2.40		2.35		2.35	
21.....	2.40		2.35		2.35	
22.....	2.40		2.35		2.35	
23.....	2.40		2.35		2.35	
24.....	2.40		2.35		2.40	
25.....	2.40		2.35		2.40	
26.....	2.40		2.35		2.40	
27.....	2.40		2.35		2.40	
28.....	2.40		2.35		2.40	
29.....	2.40		2.35		2.40	
30.....	2.40		2.35		2.40	
31.....	2.35				2.40	

No gauge height observations were made after July 31.

GAP CREEK, NEAR MAPLE CREEK.

This station was established on May 3, 1910, by H. R. Carscallen. It is located at the traffic bridge on the road allowance between Sec. 31 and 32, Tp. 11, Rge. 26, W. 3rd Mer., which is about $4\frac{1}{2}$ miles north of the town of Maple Creek.

The channel is straight for about 60 feet above the station, but is slightly curved for about 100 feet below. The left bank is high and the right low, but not liable to overflow. The bed is sandy and liable to shift.

During high water discharge measurements are made from the bridge. The initial point for soundings is marked on the north end of the bridge in red paint. The bridge is not at right angles to the direction of the current, and a coefficient is applied to the measured discharge to obtain the actual discharge. The discharge is determined in extreme low water by means of a weir.

The gauge, which is a plain staff, graduated to feet and hundredths, was read during 1910, by C. A. Peterson. It is nailed to the downstream end of the south pier of the bridge. It is referred to a point marked B. M. in red paint on the top of the cap of the left abutment; elevation, 13.48 above zero.

DISCHARGE MEASUREMENTS of Gap Creek, near Maple Creek, in 1910.

DATE	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Dis-charge.
		<i>Feet.</i>	<i>Sq.-ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
May 4.....	H. R. Carscallen.....				1.50	0.51
May 21.....	".....	27.0	8.21	0.018	1.48	0.15
June 7.....	".....	12.5	4.25	0.005	1.39	0.02
June 27.....	R. G. Swan.....					Nil.
September 6.....	".....				1.38	0.02
September 23.....	".....				1.38	0.02
November 1.....	".....				1.37	0.03

Discharges determined by using a 15-inch weir.

DAILY GAUGE HEIGHT AND DISCHARGE of Gap Creek, near Maple Creek, for 1910.

DAY.	May.		June.		July.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....			1.35	0.01	1.25	
2.....			1.35	0.01	1.25	
3.....			1.40	0.03	1.25	
4.....	1.50	0.50	1.40	0.03	1.25	
5.....	1.50	0.50	1.40	0.03	1.25	
6.....	1.50	0.50	1.40	0.03	1.25	
7.....	1.50	0.50	1.40	0.03	1.25	
8.....	1.50	0.50	1.40	0.03	1.25	
9.....	1.50	0.50	1.35	0.01	1.25	
10.....	1.45	0.07	1.35	0.01	1.25	
11.....	1.50	0.50	1.35	0.01	1.25	
12.....	1.50	0.50	1.30	†	1.25	
13.....	1.45	0.07	1.30		1.25	
14.....	1.45	0.07	1.25		1.25	
15.....	1.45	0.07	1.25		1.25	
16.....	1.50	0.50	1.25		1.25	
17.....	1.50	0.50	1.30		1.25	
18.....	1.45	0.07	1.25		*	
19.....	1.50	0.50	1.25			
20.....	1.50	0.50	1.25			
21.....	1.50	0.50	1.25			
22.....	1.50	0.50	1.25			
23.....	1.50	0.50	1.25		1.25	†
24.....	1.45	0.07	1.25		1.25	
25.....	1.45	0.07	1.25		1.25	
26.....	1.40	0.03	1.25		1.25	
27.....	1.40	0.03	1.25		*	
28.....	1.40	0.03	1.25			
29.....	1.40	0.03	1.25			
30.....	1.40	0.03	1.25			
31.....	1.40	0.03				

† No flow, water standing in pools, June 12-July 17, July 23-26.

* Creek dry, July 18-22, July 27-31.

No gauge height observations were made after July 31.

MC SHANE CREEK AT SMALL'S RANCHE.

This station was established April 23, 1909, by F. T. Fletcher. It is located on Sec. 4, Tp. 10, Rge. 27, W. 3rd Mer., at the highway bridge on the surveyed trail from Maple Creek to Ten-mile, about 12 miles south of Maple Creek. It is about 600 feet above the mouth of the creek and about 500 feet from Wm. Small's house. Mr. Small diverts water from the stream for irrigation purposes, and, as the intake of his ditch is above the station, records of daily flow do not represent the full discharge of the creek when water is being used in the ditch.

The channel is straight for 100 feet above and 200 feet below the station. Both banks are high and not liable to overflow. The bed of the stream is composed of coarse gravel and shifts at high stages. The current is swift.

The gauge, which is read daily by Mr. Small, is a plain staff, graduated to feet and hundredths, attached firmly to the right abutment on the downstream side of the bridge. The gauge is referred to bench marks as follows:—(1) Nail-heads in the top of the wooden stringer at the north or right side of the stream and on the downstream side of the bridge, marked B. M. with white paint; elevation, 9.68 feet above the zero of the gauge. (2) The top of the iron pin in the road mound situated 350 feet south of the bridge on the east side of the trail; elevation, 16.96 feet above the zero of the gauge.

Highwater measurements are made from the downstream side of the bridge. The initial point for soundings is the inner face of the right abutment of the bridge. Low-water measurements are made near the gauge by wading and at very low stages a weir is used.

There was no flow at all in this stream, either at the gauging station or above Mr. Small's Ditch during 1910.

DISCHARGE MEASUREMENTS of McShane Creek at Small's Ranche, in 1910.

DATE.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Dis-charge.
		<i>Feet.</i>	<i>Sq.-ft.</i>	<i>Ft. per Sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
April 23.....	H. R. Carscallen.....					Nil.
May 17.....	".....					Nil
June 23.....	".....					Nil
July 16.....	".....					Nil
August 3.....	".....					Nil

No flow, water standing in pools.

GAP CREEK AT SMALL'S RANCHE.

This station was established April 25, 1909, by F. T. Fletcher. It is located on Sec. 3, Tp. 10, Rge. 27, W. 3rd Mer., about 400 yards west of the surveyed trail from Maple Creek to Tenmile and about 12 miles south of Maple Creek.

The channel is straight for 600 feet above and below the station. The right bank is high and will not overflow except at very extreme flood stages; the left bank is much higher than the right and will not overflow at any stage of the stream. The bed of the stream is composed of loose, coarse gravel. The current is sluggish.

The gauge, which is read daily by Wm. Small, is a plain staff, graduated to feet and hundredths, spiked firmly to a vertical post sunk in the bed of the stream at the right bank and securely stayed to the bank. It is referred to bench marks as follows:—(1) The top of the initial point stake on the right bank, marked B. M.; elevation, 8.08 feet above gauge zero. (2) The top of the final point stake, driven close to the ground on the left bank and marked B. M.; elevation, 8.09 feet above the zero of the gauge. (3) Nail-heads on the top of the ground-log at the southwest corner of a cow shed, just below the cross-section and on the right bank; elevation, 9.60 feet above gauge zero.

Discharge measurements are made at the regular station by wading, and at very low stages a weir is used. The regular station is a cross-section taken 250 feet above the gauge and the initial and final point stakes are located on the right and left banks of the stream, respectively, at this cross-section. The initial point for soundings is a square stake driven close to the ground on the right bank and marked B. M.

DISCHARGE MEASUREMENTS of Gap Creek at Small's Ranche, in 1910.

DATE	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Dis-charge.
		<i>Feet.</i>	<i>Sq.-ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
April 23.....	H. R. Carscallen.....				2.04	0.45
May 17.....	".....	20.0	17.47	0.059	1.95	1.02
May 27.....	".....					Nil
June 23.....	".....				1.75	Nil
July 16.....	".....				1.46	Nil
August 3.....	".....				1.45	Nil
August 19.....	".....				1.49	Nil
September 8.....	".....				1.72	Nil
September 30.....	R. G. Swan.....				1.69	Nil

DAILY GAUGE HEIGHT AND DISCHARGE of Gap Creek at Small's Ranche, for 1910.

DAY.	April.		May.		June.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	2.10	0.700	2.00	0.050	1.90	0.020
2.....	2.10	0.700	2.00	0.050	1.90	0.020
3.....	2.10	0.700	2.00	0.050	1.95	0.035
4.....	2.10	0.700	2.00	0.050	1.95	0.035
5.....	2.10	0.700	2.00	0.050	1.90	0.020
6.....	2.10	0.700	2.00	0.050	1.90	0.020
7.....	2.10	0.700	2.00	0.050	1.90	0.020
8.....	2.10	0.700	2.00	0.050	1.90	0.020
9.....	2.10	0.700	2.00	0.050	1.90	0.020
10.....	2.10	0.700	2.00	0.050	1.90	0.020
11.....	2.10	0.700	1.95	0.035	1.90	0.020
12.....	2.10	0.700	1.95	0.035	1.90	0.020
13.....	2.10	0.700	1.95	0.035	1.85	0.010
14.....	2.10	0.700	1.95	0.035	1.85	0.010
15.....	2.10	0.700	1.95	0.035	1.80	*.....
16.....	2.10	0.700	1.95	0.035	1.80	.....
17.....	2.10	0.700	1.95	0.035	1.80	.....
18.....	2.10	0.700	2.10	0.700	1.80	.....
19.....	2.05	0.375	2.10	0.700	1.75	.....
20.....	2.05	0.375	2.10	0.700	1.75	.....
21.....	2.05	0.375	2.10	0.700	1.75	.....
22.....	2.05	0.375	2.10	0.700	1.75	.....
23.....	2.05	0.375	2.05	0.375	1.75	.....
24.....	2.05	0.375	2.00	0.050	1.75	.....
25.....	2.05	0.375	1.95	0.035	1.70	.....
26.....	2.00	0.050	1.95	0.035	1.70	.....
27.....	2.00	0.050	1.90	0.020	1.65	.....
28.....	2.00	0.050	1.95	0.035	1.65	.....
29.....	2.00	0.050	1.90	0.020	1.65	.....
30.....	2.00	0.050	1.90	0.020	1.65
31.....	1.90	0.020

* No flow, water standing in pools from June 14 to Oct 31.

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DAILY GAUGE HEIGHT of Gap Creek at Small's Rancho, for 1910.—*Concluded.*

DAY.	July.		August.		September.		October.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i> *	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	1.65	.....	1.45	.....	1.54	.....	1.69	.....
2.....	1.60	.....	1.45	.....	1.53	.....	1.69	.....
3.....	1.60	.....	1.45	.....	1.52	.....	1.67	.....
4.....	1.60	.....	1.45	.....	1.55	.....	1.70	.....
5.....	1.55	.....	1.45	.....	1.60	.....	1.71	.....
6.....	1.55	.....	1.45	.....	1.60	.....	1.71	.....
7.....	1.55	.....	1.45	.....	1.70	.....	1.71	.....
8.....	1.50	.....	1.45	.....	1.70	.....	1.70	.....
9.....	1.50	.....	1.45	.....	1.70	.....	1.70	.....
10.....	1.50	.....	1.46	.....	1.70	.....	1.70	.....
11.....	1.55	.....	1.46	.....	1.70	.....	1.71	.....
12.....	1.55	.....	1.46	.....	1.70	.....	1.72	.....
13.....	1.55	.....	1.46	.....	1.68	.....	1.72	.....
14.....	1.50	.....	1.46	.....	1.68	.....	1.72	.....
15.....	1.50	.....	1.48	.....	1.67	.....	1.72	.....
16.....	1.50	.....	1.50	.....	1.67	.....	1.72	.....
17.....	1.45	.....	1.50	.....	1.66	.....	1.73	.....
18.....	1.45	.....	1.48	.....	1.65	.....	1.74	.....
19.....	1.45	.....	1.48	.....	1.65	.....	1.74	.....
20.....	1.45	.....	1.47	.....	1.65	.....	1.75	.....
21.....	1.45	.....	1.47	.....	1.63	.....	1.75	.....
22.....	1.45	.....	1.48	.....	1.64	.....	1.75	.....
23.....	1.45	.....	1.50	.....	1.63	.....	1.75	.....
24.....	1.45	.....	1.51	.....	1.70	.....	1.75	.....
25.....	1.45	.....	1.51	.....	1.70	.....	1.76	.....
26.....	1.45	.....	1.51	.....	1.69	.....	1.77	.....
27.....	1.45	.....	1.50	.....	1.69	.....	1.79	.....
28.....	1.45	.....	1.50	.....	1.69	.....	1.78	.....
29.....	1.45	.....	1.50	.....	1.69	.....	1.77	.....
30.....	1.45	.....	1.51	.....	1.69	.....	1.78	.....
31.....	1.45	.....	1.53	.....	.....	.....	1.79	.....

* No flow, water standing in pools June 14 to Oct. 31.

MONTHLY DISCHARGE of Gap Creek, at Small's Ranche, for 1910.

Drainage area, 69.5 square miles.

Month.	Discharge in Second-Feet.				Run-Off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on Drainage area.	Total in acre-feet.
April.....	0.700	0.05	0.516	0.0070	0.0078	31.0
May.....	0.700	0.02	0.157	0.0020	0.0023	10.0
June.....	0.035	0.00	0.010	0.0001	0.0001	0.6
July.....						
August.....						
September.....						
October.....						
The period.....						41.6

MISCELLANEOUS DISCHARGE MEASUREMENT of Bigstick Lake Drainage Basin, in 1910.

DATE	Stream.	Locality.	Hydrographer.	Width.	Area of Section.	Dis-charge.
				Feet.		Sec.-ft.
May 29.....	Cypress Creek....	S.W. 17-9-27-3....	F. T. Fletcher....	3	0.65	0.28
August 9.....	"	N.W. 5-9-27-3....	H. R. Carscallen..	*		0.19
May 20.....	Maple Creek.....	17-13-26-3.....	F. T. Fletcher....	*		0.92
May 21.....	"	"	"	8.4	1.78	0.88
May 22.....	"	"	"	*		0.57
May 26.....	Spring Creek.....	S.E. 10-9-27-3....	"	*		0.21
May 31.....	"	"	"	*		0.12

* Weir measurements.

MANY ISLAND LAKE DRAINAGE BASIN.

General Description.

Many Island Lake is situated on the boundary line between the Provinces of Alberta and Saskatchewan, and ten miles north of the town of Walsh. It is the farthest west of several lakes which receive the drainage from the north slope of the Cypress Hills.

The water is shallow and saline and covers an approximate area of '25 square miles. •It is fed by Mackay Creek, and its tributaries Boxelder and Stony Creeks.

The annual precipitation, most of which occurs during May, June and July, is usually about 12 inches.

The streams do not have a very large flow, and during the summer months often go dry.

There are one or two small irrigation schemes in this watershed.

BOXELDER CREEK, NEAR WALSH.

This station was established May 24th, 1909, by P. M. Sauder. It is located at John Young's Farm on Sec. 2, Tp. 12, Rge. 30, W. 3rd Mer., and 2 miles East of Walsh.

The stream flows in one channel, which is crooked both above and below the gauge. The banks are high and not liable to overflow. The bed of the stream is composed of clay.

Discharge measurements are generally made by wading at or near the gauge, but during floods it may be measured from the C. P. R. bridge a few hundred feet below the gauge.

The gauge, which is a plain staff, graduated to feet and hundredths, is attached to a post at the right bank. It is referred to bench marks as follows:—(1) The top of the frame of outside cellar entrance of Mr. Young's house; elevation, 17.36 feet. (2) Two spikes driven near the south east corner of Mr. Young's house; elevation, 16.40 feet above the datum of the gauge.

There was no flow in the creek during 1910, after the gauge was established.

DISCHARGE MEASUREMENTS of Boxelder Creek at Walsh, in 1910.

DATE.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Dis- charge.
		<i>Feet.</i>	<i>Sq.-ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
April 28.....	H. R. Carscallen.....	.....	.....	.....	.....	Nil
May 24.....	P. M. Sauder.....	.....	.....	.....	.....	Nil
June 14.....	".....	.....	.....	.....	.....	Nil
June 16.....	R. G. Swan.....	.....	.....	.....	.....	Nil
July 24.....	P. M. Sauder.....	.....	.....	.....	.....	Nil
August 9.....	F. T. Fletcher.....	.....	.....	.....	.....	Nil

MACKAY CREEK AT WALSH.

This station was established on July 29, 1909, by F. T. Fletcher. It is located at the traffic bridge $\frac{1}{2}$ mile south of the C. P. R. track at Walsh. The bridge is on the N.W. $\frac{1}{4}$ Sec. 26, Tp. 11, Rge. 1, W. 4th Mer.

The channel is straight for about 225 feet above and 500 feet below the station. Both banks are clean but liable to overflow at high stages. The bed is clean, composed of clay and not liable to shift. The current is sluggish.

The gauge is a plain staff, graduated to feet and hundredths, nailed to an upright timber on the upstream side of the bridge near the right abutment.

During high water, discharge measurements are made from the downstream side of the bridge. At low stages the discharge is measured by wading, and at extreme low water a weir is used.

The gauge was read once each day by Geo. Sept, General Merchant, Walsh. The flow ceased on the 27th April, and the creek remained dry throughout the remainder of the season.

DISCHARGE MEASUREMENTS of Mackay Creek at Walsh, in 1910.

DATE.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Dis- charge.
		<i>Feet.</i>	<i>Sq.-ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
April 28.....	H. R. Carscallen.....	.....	.....	.....	0.07	Nil
May 24.....	P. M. Sauder.....	.....	.....	.....	.....	Nil
June 14.....	".....	.....	.....	.....	.....	Nil
June 16.....	F. T. Fletcher.....	.....	.....	.....	.....	Nil
June 24.....	R. G. Swan.....	.....	.....	.....	.....	Nil
August 9.....	P. M. Sauder.....	.....	.....	.....	.....	Nil

DAILY GAUGE HEIGHT AND DISCHARGE of Mackay Creek at Walsh, for 1910.

DAY.	April.		May.		June.		July.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....	0.8	*						
2.....	0.8							
3.....	0.7						1.0	*
4.....	0.6						0.4	
5.....	0.6						0.2	
6.....	0.6						†	
7.....	0.6							
8.....	0.6							
9.....	0.7							
10.....	0.7							
11.....	0.6							
12.....	0.6							
13.....	0.7							
14.....	0.7							
15.....	0.6							
16.....	0.6							
17.....	0.6							
18.....	0.6							
19.....	0.6							
20.....	0.5							
21.....	0.4							
22.....	0.4							
23.....	0.4							
24.....	0.3							
25.....	0.2							
26.....	0.1							
27.....	†							
28.....								
29.....								
30.....								
31.....								

* No flow, water standing in pools April 1-26, July 3-5.
† Creek dry April 27-July 2, July 6 to end of the season.

MISCELLANEOUS DISCHARGE MEASUREMENTS of Many Island Lake Drainage Basin, in 1910.

DATE.	Stream.	Locality.	Hydrographer.	Width.	Area of Section.	Discharge.
				<i>Feet.</i>		<i>Sec.-ft.</i>
April 28.....	Stoney Creek.....	25-11-2-4.....	H. R. Carscallen..			Nil
May 24.....	"	"	P. M. Sauder.....			Nil
June 14.....	"	"	"			Nil
June 24.....	"	"	R. G. Swan.....			Nil
August 9.....	"	"	P. M. Sauder.....			Nil

ROSS CREEK DRAINAGE BASIN.

General Description.

Ross Creek rises in Elkwater Lake, a small body of water covering an area of approximately 2 square miles, situated in Tp. 8, Rge. 3, W. 4th Mer. The creek flows in a northerly direction as far as Irvine and then turns sharply to the westward, and closely parallels the main line of the C. P. R. to Medicine Hat. Here it is joined by Sevenpersons River and the combined flow empties into South Saskatchewan River in Sec. 32, Tp. 12, Rge. 5, W. 4th Mer.

The tributaries of Ross Creek are Bullshead Creek, which joins it in Sec. 21, Tp. 12, Rge. 5, W. 4th Mer., and Gros Ventre Creek which joins it in Sec. 14, Tp. 11, Rge. 3, W. 4th Mer.

The C. P. R. takes its water supply for their tank at Irvine from this stream.

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ROSS CREEK AT IRVINE.

This station was established July 28, 1909, by F. T. Fletcher. It is located at the traffic bridge in the town of Irvine, on Sec. 31, Tp. 11, Rge. 2, W. 4th Mer., and about 400 yards below the C. P. R. dam.

The stream flows in one channel, which is slightly curved for 75 feet above the station, and almost straight for 600 feet below. The banks are composed of clay, high and not liable to overflow. The bed is composed of sand and gravel and may shift at high stages.

Discharge measurements are made from the downstream side of the bridge during high stages of the stream, and during low water it is waded. In extreme low water a weir is used.

The gauge, which is a plain staff, graduated to feet and hundredths, is spiked to the downstream pile of the first row from the left abutment. It is referred to bench marks as follows:— (1) The top of the downstream pile in the first row from the left abutment; elevation, 15.52 feet above the datum of the gauge. (2) The top of the south rail of C. P. R., south of station; elevation, 23.11. It was read during 1910, by H. G. Price of Irvine.

DISCHARGE MEASUREMENTS of Ross Creek at Irvine, in 1910.

DATE.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Discharge.
		<i>Feet.</i>	<i>Sq.-ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
April 28.....	H. R. Carscallen.....	2.8	0.40	0.175	0.73	0.07
May 24.....	P. M. Sauder.....	9.0	2.21	0.435	0.90	0.96*
June 14.....	".....					Nil†
June 25.....	R. G. Swan.....	4.8	1.00	0.038	0.66	0.04
July 5.....	F. T. Fletcher.....					Nil†
July 19.....	H. R. Carscallen.....				0.65	0.01*
August 9.....	P. M. Sauder.....					Nil

* Discharge determined by using a 15-inch weir.

† Flow too small to gauge.

DAILY GAUGE HEIGHT AND DISCHARGE of Ross Creek at Irvine, for 1910.

DAY.	May.		June.		July.		August.	
	Gauge Height.	Discharge.	Gauge Height.	Discharge.	Gauge Height.	Discharge.	Gauge Height.	Discharge.
	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
1.....			0.84	0.58	0.66	0.04	0.62	*.....
2.....			0.83	0.53	0.66	0.04	0.63	0.01
3.....			0.82	0.48	0.66	0.04	0.60	*.....
4.....			0.81	0.43	0.66	0.04	0.60	
5.....			0.80	0.38	0.66	0.04	0.60	
6.....			0.78	0.30	0.66	0.04	0.59	
7.....			0.74	0.18	0.65	0.03	0.58	
8.....			0.72	0.13	0.65	0.03	0.55	
9.....			0.72	0.13	0.64	0.02	0.54	
10.....			0.70	0.09	0.64	0.02	0.17	
11.....			0.68	0.06	0.64	0.02	0.12	
12.....			0.68	0.06	0.64	0.02	0.11	
13.....			0.68	0.06	0.64	0.02	0.08	
14.....			0.68	0.06	0.64	0.02	0.07	
15.....			0.68	0.06	0.64	0.02	0.66	0.04
16.....			0.68	0.06	0.64	0.02	0.66	0.04
17.....			0.67	0.05	0.64	0.02	0.59	*.....
18.....			0.68	0.06	0.64	0.02	0.54	
19.....			0.67	0.05	0.64	0.02	0.27	
20.....			0.67	0.05	0.64	0.02	0.12	
21.....			0.67	0.05	0.64	0.02	0.05	
22.....			0.67	0.05	0.64	0.02	0.03	
23.....			0.67	0.05	0.64	0.02	0.61	
24.....	0.90	0.96	0.67	0.05	0.64	0.02	0.10	
25.....	0.90	0.96	0.67	0.05	0.64	0.02	0.02	
26.....	0.89	0.89	0.67	0.05	0.64	0.02	0.00	
27.....	0.88	0.82	0.67	0.05	0.64	0.02		
28.....	0.87	0.75	0.66	0.04	0.64	0.02		
29.....	0.86	0.69	0.66	0.04	0.64	0.02		
30.....	0.85	0.63	0.66	0.04	0.64	0.02		
31.....	0.84	0.58			0.63	0.01		

* No flow, water standing in pools Aug. 1, Aug. 3-14, Aug. 17-26.

SEVENPERSONS RIVER DRAINAGE BASIN.

BULLSHEAD CREEK, NEAR DUNMORE.

This station was established July 26, 1909, by F. T. Fletcher. It is located at the traffic bridge on the S.W. $\frac{1}{4}$ Sec. 16, Tp. 12, Rge. 5, W. 4th Mer. It is 4 miles from Medicine Hat, and 1 mile above the junction of Ross and Bullshead Creeks.

The stream flows in one channel, which is straight for about 200 feet above and 450 feet below the station. The banks are high, clean and not liable to overflow. The bed is composed of sand, and shifts.

During high water discharge measurements are made from the downstream side of the bridge, but during low water the discharge is measured by wading, or by means of a weir.

The gauge, which is a plain staff, graduated to feet and hundredths, is spiked to the downstream side of the first row of piles from the right abutment. It is referred to the following bench marks:—(1) A spike driven in the top of the centre row of piles; elevation, 7.39. (2) The top of a wooden plug driven flush with the ground in the road mound on right bank; elevation, 6.34.

As the creek was dry almost all year, no observer was engaged during 1910.

DISCHARGE MEASUREMENTS of Bullshead Creek at Dunmore, in 1910.

DATE.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Dis-charge.
		<i>Feet.</i>	<i>Sq.-ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
March 31.....	H. R. Carscallen.....	8.9	1.87	0.631	0.55	1.18
April 27.....	".....	2.5	0.32	0.187	0.46	0.06
May 23.....	P. M. Sauder.....	3.0	0.30	0.033	0.44	0.01*
June 14.....	".....					Nil
July 9.....	F. T. Fletcher.....					Nil
August 19.....	P. M. Sauder.....					Nil

* Discharge determined by using a 15-inch weir.

SEVENPERSONS RIVER AT MEDICINE HAT.

This station was established on April 27, 1910, by H. R. Carscallen. It is located in Sec. 30, Tp. 12, Rge. 5, W. 4th Mer., at the bridge on the road from Medicine Hat to Dunmore Junction and about 1½ miles east of the C. P. R. station at Medicine Hat.

The channel is straight for about 100 feet above and below the station. Both banks are high and wooded. The stream bed is sandy and liable to change at high water.

During high water stages discharge measurements are made with a current meter. The initial point of soundings is the inner face of the left abutment of the bridge. Low water measurements are made with a weir.

The gauge, which is a plain staff, graduated to feet and hundredths, is attached to the west or left abutment of the bridge. It is referred to two bench marks:—(1) The top of a bolt-head in the cap of the right abutment, elevation, 10.41 feet above the datum of the gauge. (2) The head of a spike driven into a large stump about 100 feet east of the rod, elevation, 11.40 feet above the zero of the gauge.

DISCHARGE MEASUREMENTSS of Sevenpersons River at Medicine Hat, in 1910.

DATE	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Dis-charge.
		<i>Feet.</i>	<i>Sq.-ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
April 27.....	H. R. Carscallen.....	2.0	0.26	0.577	0.84	0.15
May 23.....	P. M. Sauder.....	11.0	3.23	0.015	0.82	0.05*
June 14.....	".....					Nil
July 6.....	F. T. Fletcher.....					Nil.
August 19.....	P. M. Sauder.....					Nil

* Discharge determined by using a 15-inch weir.

DAILY GAUGE HEIGHT AND DISCHARGE of Sevenpersons River. at Medicine Hat, for 1910.

DAY.	April.		May.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	Feet.	Sec.-ft.	Feet.	Sec.-ft.
1.....			0.90	0.68
2.....			0.85	0.22
3.....			0.85	0.22
4.....			0.85	0.22
5.....			0.85	0.22
6.....			0.85	0.22
7.....			0.85	0.22
8.....			0.80	0.02
9.....			0.80	0.02
10.....			0.85	0.22
11.....			0.90	0.68
12.....			0.87	0.40
13.....			0.85	0.22
14.....			0.85	0.22
15.....			0.85	0.22
16.....			0.80	0.02
17.....			0.80	0.02
18.....			0.85	0.22
19.....			0.85	0.22
20.....			0.80	0.02
21.....			0.80	0.02
22.....			0.80	0.02
23.....			0.80	0.02
24.....			0.75	*
25.....			0.75	
26.....			0.70	
27.....	0.85	0.22	0.60	
28.....	0.85	0.22	0.50	
29.....	0.90	0.68		
30.....	0.90	0.68		
31.....				

* No flow, water standing in pools May 24-28.

MOOSEJAW CREEK DRAINAGE BASIN.

General Description.

Moosejaw Creek rises in the vicinity of Yellowgrass and flows in a north and westerly direction until it reaches the city of Moosejaw, and thence in an easterly and northerly direction; finally emptying into the Qu'Appelle River near Buffalo Pound Lake. From the headwaters to the city of Moosejaw, the drainage area is estimated at about one thousand eight hundred and thirty square miles. This area is almost entirely devoid of tree growth, except that the valley is lined with brush in the vicinity of Moosejaw.

Throughout its entire length the creek flows in a very crooked but well defined channel. The upper portion of the valley is small, being merely a depression, but it gradually increases in size until at Drinkwater it is about 30 feet deep and at Moosejaw about 80 feet deep. The fall in the creek is very small, and particularly so between Drinkwater and Moosejaw, where the total fall is only 67.5 feet or an average of 2.3 feet per mile of valley.

The lack of timber growth and the clayey surface-cover of the drainage basin tend to the rapid collection and delivery of storm water to the main channel. The flow of the river, is therefore subject to sudden rises during periods of abundant rain-fall or the melting of the snow in the spring, but the high part of the flood quickly passes and the creek soon resumes its normal conditions.

WATER SUPPLY.

It is pretty generally believed that 1910 was a year of exceptional drought and the rain-fall and run-off were much below the average. A study of the precipitation records in the accompanying table covering the period from 1895 to the present does not altogether bear this out. In discussing this table it should be noted that no account seems to have been taken of the snow during the time preceding the fall of 1908. This table indicates that the average precipitation in the vicinity of Moosejaw for the past fifteen years is between thirteen and fourteen inches. The only point in the watershed of Moosejaw Creek at which precipitation records have been obtained is at Moosejaw, but there is no doubt but that these records give a fair average for the

whole basin. With the exception of the month of July, the precipitation for each month for the past year has differed but little from the average. The rain-fall in July is usually one of the highest during the year, but this year it was very small. This coupled with high temperatures and high winds appears to be largely responsible for the drought.

With the few records of discharge which have been obtained, it is impossible to determine the relationship of run-off and rain-fall. The precipitation in 1909 was somewhat above the average, and as the total for this year is very little below the average it would hardly be expected that the total discharge of Moosejaw Creek during 1910 should be very much below the average. Residents along the creek, however, claim that it was lower this year than they have ever seen it before.

Two gauging stations were established on the creek; one at the bridge on the N.W. $\frac{1}{4}$ Sec. 16-16-26-2 near V. J. McCarthy's farm and the other at the bridge on the road allowance between Secs. 14 and 15, Tp. 15, Rge. 25, W. 2nd Mer., near W. F. Bryce's farm. The height of the water was read daily by observers living near the stations and the flow measured at both stations about once every two weeks. With these records the mean daily discharge of the creek at each station was computed, and tables of monthly discharges were compiled. The creek broke up and commenced to flow at Moosejaw on the 17th of March, and continued to flow until the 25th of July, when the flow ceased. The creek did not entirely dry up as there has been a small discharge from springs five and six miles above the city, and water has been standing in pools, in the channel of the stream.

From the table of "Monthly Discharge" at McCarthy's farm, it will be seen that the estimated total discharge of Moosejaw Creek near Moosejaw for the past year is 4,112.6 acre-feet or 1,116,455,747 Imperial gallons.

The Canadian Pacific Railway Company has dams at Milestone, Rouleau, Drinkwater, two at Moosejaw and one at Pasqua. There is also a municipality dam in Sec. 19-15-24-2, which supplies water to the neighbourhood in periods when there is no flow in the creek. No allowance need be made for the dams above the gauging station at McCarthy's farm as they were always full while there was flow in the creek. The Canadian Pacific Railway have, however, been licensed to divert 1.154 cu. ft. per sec. from the creek at Moosejaw and 0.0625 cu. ft. per sec. at Pasqua. Therefore, only that part of the flow in excess of 1.2165 cu. ft. per sec. is available. Deducting this from the discharges at McCarthy's farm, the total available during the past year was 3,823.5 acre-feet=1,037,973,192 Imperial gallons. Allowing the usual estimate of 100 gallons per day per capita, which would be little enough when the loss by evaporation and seepage from a large reservoir is included, this would only be sufficient for a city of 28,438 inhabitants. The supply would, however, be considerably augmented by storing the extra flow during wet years for use during dry years, and in that way a supply for a much larger population can be obtained from the creek.

TOPOGRAPHIC SURVEY.

A careful topographic survey was made of Moosejaw valley from the City of Moosejaw to a point above Rouleau. The stadia method was employed throughout. A traverse line was projected along each bank of the valley using the stadia to measure all distances. The north and south section lines were assumed as true meridians. The traverse lines were tied in to convenient section mounds every few miles and the bearings checked, thus eliminating all errors in location. The creek and the contour lines were established by taking numerous side shots from the traverse stations and sketch topography was taken to assist in plotting the notes. The datum taken for the elevations was mean sea level and the initial elevation was obtained from a Bench Mark of the Canadian Pacific Railway at their station in Moosejaw. Two separate lines of levels were run, one on each bank of the valley to carry the elevation from one traverse station to another. The levels were carefully checked throughout the survey. The datum of the Canadian Pacific Railway Company elevations is 20.63 below the datum of the City of Moosejaw elevations, hence the Bench Mark on the telegraph pole at the south west corner of Main and Hall streets is at elevation 1800.87 referred to C. P. R. datum.

The map prepared from the data obtained by the topographic survey shows the configuration of the surface of the ground by contours of 10 foot intervals. Owing to its size and the expense of lithographing, the map is not published, but blue prints of it can be furnished for a small fee.

RESERVOIR SITES.

While the topographic survey was in progress a careful reconnaissance was made to discover the most inviting places for a location of dams and reservoirs. This inspection revealed very few places where there is the desired combination of suitable dam site and broad valley. The selection of a suitable site is made still more difficult by the very small fall in the creek, and no matter where a dam is constructed the reservoir will have a large flooded area in comparison with its capacity.

Four dam sites "A," "B," "C" and "D," offer the best opportunities for storage and a cross-section of each was taken. The map shows the land which would be flooded by the erection of a dam of any possible height at any of the proposed sites. Tables showing the flooded areas and capacities of the reservoirs, for dams which would raise the water in the reservoir to any given height up to elevation 1,800 feet have been prepared.



Falls on Bow River near Banff, Alta.; in Summer.



Falls on Bow River, near Banff, Alta.; in Winter.

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Borings were made at each site to determine the depth of a good foundation. At site "A" blue clay was found at elevation 1,747, but at the other three sites it was impossible to force the small auger at our disposal, through the gravel and boulders. Impervious clay is said to be found at about 18 feet below the bottom level of the valley and appears to underlie the whole valley. Further borings should be made to determine the depth of blue clay with exactitude.

Site "D," which is within the city limits, near the east boundary of the N.W. $\frac{1}{4}$ Sec. 28, Tp. 16, Rge. 26, W. 2nd Mer., is a very favourable location for a dam, and the valley widens out above it making a fine large basin with steep banks. The land in this basin is, however, considerably improved and highly assessed. Several dwellings, green-houses and other buildings would have to be moved. The elevation of the guard rail on the steel bridge on Main Street is only 1,743, and if water were raised above elevation 1,740 the bridge would have to be raised and approaches constructed. If water were raised above elevation 1,768, a steel bridge on the N.W. $\frac{1}{4}$ Sec. 16-16-26-2 and a wooden bridge on the S.E. $\frac{1}{4}$ Sec. 9-16-26-2 would also have to be raised and approaches constructed.

Sites "C" on the N.W. $\frac{1}{4}$ Sec. 29, Tp. 16, Rge. 26, W. 2nd Mer., and "B" on the S.W. $\frac{1}{4}$ Sec. 29, Tp. 16, Rge. 26, W. 2nd Mer. are above site "D" and outside the city limits. They would not store nearly as much water as site "D" without a higher dam. The cost of the dam would, however, be less as the valley is much narrower. There is very little difference in the character of the cross-sections, but "C" seems to be a little the better site and is almost half a mile nearer the city. A dam at either of these would not flood nearly as much highly assessed land as one at site "D." If water were raised above elevation 1,768, the steel bridge on the N.W. $\frac{1}{4}$ Sec. 16-16-26-2 and the wooden bridge on the S.E. $\frac{1}{4}$ Sec. 9-16-26-2 would have to be raised and approaches constructed.

Site "A" near the south boundary of the N.E. $\frac{1}{4}$ Sec. 9, Tp. 16, Rge. 26, W. 2nd Mer. would require the least embankment and the flooded lands are only farm or pasture lands. A bridge could be constructed on the dam to replace the wooden one on the S.E. $\frac{1}{4}$ Sec. 9-16-26-2. This site is, however, five miles from the centre of Moosejaw.

The fact that the valley of Moosejaw Creek is thickly populated and a great deal of improvement made by farmers, increase the cost of the reservoir very much. The land is improved and cultivated, and therefore valuable. Farmers own land on both sides of the stream and in natural conditions, they can ford it at almost any time and the establishment of a reservoir would divide their farms. Bridges have been erected on a number of the roads and as the population increases, more roads will be opened and more bridges built. It is impossible to raise the water more than a few feet without flooding the whole of the bottom of the valley. Bridges would have to be raised and long approaches constructed in order to cross the valley.

The water in Moosejaw Creek is not of very good quality and must be purified by filtration, before it can be used for drinking purposes. As the valley becomes more thickly populated there will be more pollution and the cost of treating the water will increase. A large quantity of vegetable matter must be removed and the shores treated before the valley can be safely used as a storage basin. The reservoir should be fenced to protect it from stock and to prevent them from miring in the mud as the water is drawn down.

POWER.

The water power in a stream depends directly on the fall of the stream within a given distance and the amount of flow which can be uniformly maintained throughout the year. As above mentioned, the total flow of Moosejaw Creek at McCarthy's farm during the past year is estimated at 4112.6 acre-feet, which without allowing for loss by evaporation and seepage, equals a uniform flow of 5.68 cu. ft. per sec. While there are probably seasons when there is a much larger flow, the quantity of power that could be developed from this flow is so small that it does not warrant further investigations.

TABLE OF FLOODED AREAS AND CAPACITIES OF PROPOSED RESERVOIRS.

Dam Site "A."

Elevation.	Flooded Area.		Capacity of Reservoir.
<i>C. P. R. Datum.</i>	<i>Acres.</i>	<i>Acre Feet.</i>	<i>Imperial Gallons.</i>
1,800	2,517.5	35,892	9,713,716,460
1,790	1,484.0	15,343	4,165,137,887
1,780	619.0	5,803	1,576,706,661
1,770	305.0	1,613	437,887,621
1,760	36.0	61	16,544,104

Dam Site "B."

Elevation.	Flooded Area.		Capacity of Reservoir.
<i>C. P. R. Datum.</i>	<i>Acres.</i>	<i>Acre Feet.</i>	<i>Imperial Gallons.</i>
1,800	3,309.6	61,459	16,684,511,666
1,790	2,161.3	33,269	9,031,648,118
1,780	1,219.2	17,737	4,815,003,849
1,770	791.5	7,658	2,078,886,426
1,760	330.3	2,520	684,087,722
1,750	90.7	414	112,487,139

Dam Site "C."

Elevation.	Flooded Area.		Capacity of Reservoir.
<i>C. P. R. Datum.</i>	<i>Acres.</i>	<i>Acre Feet.</i>	<i>Imperial Gallons.</i>
1,800	3,394.0	64,397	17,481,963,381
1,790	2,231.3	35,658	9,680,113,285
1,780	1,280.6	19,221	5,218,066,471
1,770	846.0	8,812	2,392,338,856
1,760	377.6	2,917	791,775,235
1,750	121.5	655	177,706,142
1,740	5.8	18	4,775,192

Dam Site "D."

Elevation.	Flooded Area.		Capacity of Reservoir.
<i>C. P. R. Datum.</i>	<i>Acres.</i>	<i>Acre Feet.</i>	<i>Imperial Gallons.</i>
1,800	3,734.0	79,381.0	21,549,716,117
1,790	2,540.2	47,484.0	12,890,541,157
1,780	1,567.0	27,998.0	7,600,664,912
1,770	1,111.0	14,908.0	4,047,017,705
1,760	622.8	6,654.0	1,806,404,550
1,750	290.4	2,035.0	552,388,511
1,740	76.2	452.0	122,805,789
1,730	12.4	9.5	2,565,410

RECORDS OF PRECIPITATION AT MOOSEJAW, SASK.

DATE.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	TOTAL.
1895.....	1.14	0.28	0.61	0.23	3.82	2.26	2.18	.....	0.97	0.19	1.72	0.38	13.78
1896.....	.....	.....	.....	2.23	2.78	2.64	1.24	1.66	0.52	.....	.....	.....	11.07
1897.....	.....	.....	.....	.....	0.13	1.35	0.96	0.30	0.49	0.25	.....	.....	3.48
1898.....	.....	.....	.....	0.38	0.42	2.48	2.26	0.42	1.56	0.50	.....	.....	8.02
1899.....	.....	.....	.....	0.60	3.76	3.02	1.36	2.44	0.50	0.32	0.30	.....	12.30
1900.....	.....	.....	.....	.....	1.51	0.19	1.51	2.09	2.41	0.39	.....	.....	8.10
1901.....	.....	.....	0.04	0.19	1.78	2.79	5.08	0.39	2.86	0.52	.....	.....	13.61
1902.....	.....	.....	0.85	0.46	1.74	4.32	2.17	0.49	0.34	.....	.....	.....	10.37
1903.....	.....	.....	.....	.....	1.38	6.92	3.61	3.26	0.80	0.33	.....	.....	16.30
1904.....	.....	.....	0.35	0.37	1.51	2.59	1.06	0.48	1.65	0.35	0.02	.....	8.38
1905.....	.....	.....	0.30	0.07	4.30	5.68	4.26	0.78	0.83	0.92	0.15	.....	17.29
1906.....	.....	0.20	.....	1.34	3.24	6.53	1.32	2.27	1.39	0.26	0.22	.....	16.77
1907.....	.....	.....	0.21	0.21	0.91	2.63	1.26	3.12	0.51	0.55	.....	.....	9.40
1908.....	.....	.....	.....	0.49	.....	0.96	0.87	1.41	0.11	1.12	0.21	0.46	5.63
1909.....	0.97	0.17	0.22	0.59	3.23	2.79	6.52	2.05	0.36	0.63	0.70	0.71	18.94
1910.....	0.10	0.21	0.93	0.21	3.20	3.06	0.24	2.47	0.16	0.21	0.53	1.28	12.60
Average.....	0.737	0.215	0.439	0.567	2.247	3.137	2.244	1.575	0.966	2.467	0.481	0.707	13.78

MOOSEJAW CREEK AT MCCARTHY'S FARM.

This station was established on April 7, 1910, by P. M. Sauder and W. H. Greene. It is located at the traffic bridge in Sec. 16, Tp. 16, Rge. 26, W. 2nd Mer., and is 3 miles south of Moosejaw Post Office.

The stream flows in one channel which is straight for about 100 feet above and 300 feet below the station. The right bank is high, slightly wooded, and not liable to overflow. The left bank is low, slightly wooded and liable to overflow. The bed of the stream is composed of mud at the bridge but a short distance below it is composed of gravel.

During high water discharge measurements are made from the downstream side of the bridge, but in low water they are made by wading about 30 feet downstream. The initial point for soundings is at the west end of the handrail of the bridge.

The gauge, which is a plain staff, graduated to feet and hundredths, is nailed to the inner face of the right abutment. It is referred to the top of a bolt between two notches in the guard rail, just above the gauge; elevation, 23.19 feet above the datum of the gauge.

The gauge was read during 1910 by V. J. McCarthy.

DISCHARGE MEASUREMENTS of Moosejaw Creek at McCarthy's Farm, in 1910.

DATE.	Hydrographer.	Width.	Area of section.	Mean velocity.	Gauge height.	Dis-charge.
		<i>Feet.</i>	<i>Sq.-ft.</i>	<i>Ft. per sec.</i>	<i>Feet.</i>	<i>Sec.-ft.</i>
March 19.....	A. W. Pae.....	16.0	5.46	0.610	.....	3.34
April 7.....	P. M. Sauder.....	30.0	21.05	1.309	1.20	27.55
April 7.....	Whyte and Degnan.....	30.0	24.25	1.161	.....	28.17
April 9.....	".....	29.0	19.05	0.999	.....	19.04
April 15.....	W. H. Greene.....	25.0	10.60	0.569	0.82	6.03
April 18.....	".....	22.0	9.40	0.254	0.67	2.39
April 26.....	".....	20.0	6.80	0.157	0.55	1.07
May 3.....	".....	19.0	5.60	0.223	0.55	1.25
May 26.....	".....	32.5	74.25	1.409	1.78	104.65
May 26.....	P. M. Sauder.....	31.0	62.42	1.524	1.78	95.16
May 26.....	Whyte & Degnan.....	31.0	62.43	1.525	1.77	95.23
May 30.....	P. M. Sauder.....	32.8	36.27	1.098	1.26	39.83
June 4.....	W. H. Greene.....	32.2	58.01	0.800	1.24	46.41
June 15.....	".....	30.0	18.10	1.347	1.06	24.38
June 29.....	".....	19.0	7.10	0.900	0.73	6.39
August 12.....	P. M. Sauder.....	.....	.....	.....	.....	Nil.

DAILY GAUGE HEIGHT AND DISCHARGE of Moosejaw Creek at McCarthy's Farm, for 1910.

DAY.	April.		May.		June.		July.		August.	
	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.	Gauge Height.	Dis-charge.
	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Feet.	Sec.-ft.	Fe.	Sec.-ft.	Feet.	Sec.-ft.
1.....			0.55	1.10	1.16	31.60	0.65	4.35	†	
2.....			0.55	1.10	1.15	30.75	0.62	3.72		
3.....			0.55	1.10	1.15	30.75	0.58	2.96		
4.....			0.55	1.10	1.14	29.95	0.56	2.62		
5.....			0.55	1.10	1.13	29.15	0.55	2.45		
6.....			0.54	1.01	1.13	29.15	0.52	2.03		
7.....	1.20	27.45	0.53	0.92	1.16	31.60	0.50	1.75		
8.....	1.14	22.79	0.52	0.83	1.30	43.60	0.50	1.75		
9.....	1.03	15.68	0.51	0.74	1.30	43.60	0.50	1.75		
10.....	1.02	15.12	0.50	0.65	1.18	33.30	0.50	1.75		
11.....	1.05	16.80	0.48	0.51	1.17	32.45	0.49	1.64		
12.....	0.98	12.96	0.48	0.51	1.21	35.85	0.47	1.42		
13.....	0.92	10.02	0.48	0.51	1.23	37.55	0.46	1.31		
14.....	0.87	7.96	0.48	0.51	1.12	28.35	0.45	1.20		
15.....	0.80	5.60	0.56	1.20	1.11	27.55	0.44	1.11		
16.....	0.75	4.20	0.65	2.25	1.13	29.15	0.42	0.93		
17.....	0.70	3.10	0.65	2.25	1.05	23.00	0.40	0.75		
18.....	0.70	3.10	0.68	2.76	0.97	17.61	0.39	0.68		
19.....	0.65	2.25	0.78	5.04	0.92	14.64	0.37	0.54		
20.....	0.65	2.25	1.17	25.08	0.84	10.58	0.36	0.47		
21.....	0.63	1.99	1.68	*75.00	0.76	7.50	0.35	0.40		
22.....	0.60	1.60	1.92	*104.10	0.75	7.15	0.34	0.34		
23.....	0.59	1.50	1.98	*112.15	0.90	13.50	0.33	0.28		
24.....	0.58	1.40	1.97	*112.80	0.92	14.64	0.32	0.22		
25.....	0.56	1.20	1.91	*108.75	0.90	13.50	0.31	0.16		
26.....	0.55	1.10	1.77	94.18	0.85	11.00	0.28	%		
27.....	0.56	1.20	1.59	74.00	0.75	7.15	0.26			
28.....	0.58	1.40	1.42	55.48	0.71	5.91	0.22			
29.....	0.58	1.40	1.31	44.54	0.74	6.84	0.21			
30.....	0.55	1.10	1.22	36.70	0.69	5.35	0.20			
31.....			1.23	37.55			0.17			

* Changing conditions.
% No flow, water standing in pools July 26-31.
† Creek dry Aug. 1-Oct. 29.

MONTHLY DISCHARGE of Moosejaw Creek at McCarthy's Farm, for 1910

Drainage area, *1,765 square miles.

Month.	Discharge in Second-Feet.				Run-Off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on Drainage area.	Total in acre-feet.
April (7-30).....	27.45	1.10	6.80	0.0039	0.0035	324
May.....	112.80	0.51	29.21	0.0165	0.0190	1796
June.....	43.60	5.35	22.77	0.0129	0.0144	1,354
July.....	4.35	0.00	1.18	0.0007	0.0008	73
August.....						
September.....						
The period.....						3,547

* Approximate owing to lack of topography on maps.

SOURIS RIVER DRAINAGE BASIN.

General Description.

The source of Souris River is in marshes near Yellow Grass, Sask. From here it flows in a south-easterly direction almost paralleling the Soo Line of the C. P. R. to Estevan, where it turns south, and crosses the international boundary in Range 34, W. of Principal Mer. After making a loop into North Dakota it re-crosses the boundary line in Range 27, W. 1st Mer., and flows in a north-easterly direction to Souris, Man., where it turns east and finally joins Assiniboine River in Tp. 8, Rge. 16, W. of Principal Mer.

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This stream drains a large tract of typical western plains. The rain-fall will probably average very little over 15 inches, and is usually sufficiently divided over the year to prevent excessive run-off, or floods. At times when there is an unusual amount of rain-fall and in the early spring, the water drains into the streams very rapidly and causes a flood of short duration. There are towns, villages and farms all along the course of this stream and its tributaries, which depend on it for a domestic and industrial water supply. In North Dakota it has been proposed to divert water for irrigation purposes.

MISCELLANEOUS DISCHARGE MEASUREMENTS of Souris River Drainage Basin, in 1910.

DATE.	Stream.	Locality.	Hydrographer.	Width.	Area of Section.	Dis-charge.
				<i>Feet.</i>		<i>Sec.-ft.</i>
July 27.....	Souris River.....	30-2-1-2.....	P. M. Sauder.....	13	7.3	3.79

MISCELLANEOUS MEASUREMENTS.

A LARGE NUMBER OF MISCELLANEOUS DISCHARGE MEASUREMENTS made by the Irrigation Surveys, from the year 1894 to the end of 1909, were not included in the "Report of Progress of Stream Measurements for the Calendar Year, 1909." The records have been carefully examined and all measurements which were not published in that report are given here in lists according to drainage basins.

ANTELOPE LAKE DRAINAGE BASIN.

DATE.	Stream.	Locality.	Hydrographer.	Discharge.	Remarks.
1896.				<i>Sec.-ft.</i>	
September 23...	Bridge Creek.....	Sec. 25-13-29-3....	J. Gibbons.....	92.0	Flood stage.
1909.					
July 21.....	"	Sec. 33-10-22-3....	R. J. Burley.....	1.7	
August 2.....	"	"	"	0.29	

BATTLE CREEK DRAINAGE BASIN.

1897.					
July 19.....	Battle Creek.....	Sec. 35-4-27-3....	R. W. Macintyre.	29.37	
August 14.....	"	Sec. 36-7-30-3....	"	6.1	
1907.					
September 18...	"	Sec. 30-4-26-3....	R. J. Burley.....	23.57	
1908.					
September 14...	"	S.E. 36-4-26-3....	"	0.79	
1909.					
June 8.....	"	N.W. 3-7-29-3....	F. T. Fletcher....	36.75	
June 16.....	"	"	R. J. Burley.....	5.65	
June 21.....	"	S.W. 23-8-1-4....	"	122.65	
September 24...	"	Sec. 29-4-26-3....	F. T. Fletcher....	11.61	
September 27...	"	Sec. 1-6-28-3.....	"	12.42	
1909.					
June 7.....	Gaff Creek.....	S.E. 3-7-29-3....	"	0.44	Weir measurement.
June 17.....	Graburn Creek....	N.E. 14-8-1-4....	"	4.74	
1908.					
October 12.....	Sixmile Creek.....	Sec. 32-7-28-3....	R. J. Burley.....	0.59	Flow greater above point of gauging.
1909.					
June 7.....	"	Sec. 11-8-29-3....	F. T. Fletcher....	4.57	
June 4.....	Spring Creek.....	Sec. 24-7-29-3....	"	0.33	
June 8.....	Whitemud Coulee.	Sec. 23-7-29-3....	"	0.14	

BELLY RIVER DRAINAGE BASIN.

DATE.	Stream.	Locality.	Hydrographer.	Discharge.	Remarks.
1894.				Sec.-ft.	
August 18.....	Belly River.....	Sec. 31-5-25-4.....	A. O. Wheeler....	442.1	
August 22.....	"	Sec. 1-5-27-4.....	"	424.6	
September 3.....	"	Sec. 1-3-28-4.....	"	423.8	
October 8.....	"	Sec. 25-8-23-4.....	"	2,423.3	Below confluence of Oldman River.
October 10.....	"	Sec. 36-8-22-4.....	"	3,980.5	do St. Mary Ri
October 13.....	"	Sec. 33-8-22-4.....	"	1,129.2	do Waterton River
1906.					
September 18...	"	Sec. 13-3-28-4.....	J. F. Hamilton...	160.09	
September 20...	"	Sec. 16-1-28-4.....	"	131.45	
September 24...	"	Sec. 13-3-28-4.....	"	180.84	
1907.					
July 26.....	"	Sec. 13-3-28-4.....	I. J. Walmsley...	913.1	
August 13.....	"	"	"	503.55	
September 18...	"	Sec. 21-6-25-4.....	"	665.7	
July 30.....	Bullhorn Coulee...	Sec. 34-2-27-4.....	"	Nil	Water only in poo
August 12.....	" .....	" .....	" .....	.....	Only slight flow. ls.
1894.					
September 3...	Mami Creek.....	Sec. 5-3-27-4.....	A. O. Wheeler....	1.0	
1906.					
September 15...	"	Sec. 19-2-27-4.....	J. F. Hamilton...	2.97	
1907.					
July 30.....	"	Sec. 36-2-28-4.....	I. J. Walmsley...	4.3	
July 27.....	" W. Branch	Sec. 18-2-27-4.....	"	7.5	
August 12.....	"	"	"	4.5	
July 27.....	" E. Branch	"	"	0.2	
August 12.....	"	"	"	0.3	

BIGSTICK LAKE DRAINAGE BASIN.

1896.					
June 4.....	Gap Creek.....	Sec. 25-11-27-3....	J. Gibbons.....	7.4	
1908.					
May 19.....	"	Sec. 31-9-27-3.....	F. T. Fletcher....	0.94	Weir measurement.
October 13.....	"	Sec. 2-9-28-3.....	"	0.19	Weir measurement.
1909.					
June 28.....	"	N.E.34-10-27-3....	R. J. Burley.....	37.93	
1896.					
May 29.....	Maple Creek.....	Sec. 16-11-26-3....	J. Gibbons.....	8.75	Low water.
1906.					
June 13.....	"	Sec. 4-12-26-3.....	R. J. Burley.....	254.0	
1907.					
June 3.....	"	N.E. 4-12-26-3...	"	17.2	
1908.					
May 7.....	"	N.E. 9-11-26-3....	"	0.11	

BOW RIVER DRAINAGE BASIN.

1894.					
June 25.....	Bow River.....	Sec. 34-24-2-5.....	J. S. Dennis.....	9,271.8	
August 11.....	"	"	"	6,654.7	
September 27...	"	"	"	2,784.5	

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BOW RIVER DRAINAGE BASIN.—*Continued.*

DATE.	Stream.	Locality.	Hydrographer.	Discharge.	Remarks.
1895.				<i>Sec.-ft.</i>	
October 12.....	Bow River.....	Sec. 13-24-1-5.....	J. S. Dennis.....	2,909.7	Low water.
1906.					
February 3.....	"	Sec. 32-24-8-5.....	J. F. Hamilton...	728.7	"
October 23.....	"	Sec. 25-21-28-4.....	"	2,507.7	"
November 1....	"	Sec. 13-24-1-5.....	"	2,138.1	"
1907.					
October 22.....	"	Sec. 15-24-1-5.....	"	2,800.3	"
1894.					
September 25...	Bighill Creek.....	Sec. 13-26-4-5.....	T. D. Green.....	1.70	"
1895.					
July 4.....	Bragg Creek.....	N.E. 12-23-5-5.....	A. O. Wheeler....	10.56	"
July 25.....	Canon Creek.....	Sec. 15-22-6-5.....	"	17.25	"
July 15.....	Canon Creek, Branch of.....	Sec. 30-22-6-5.....	"	7.37	"
1894.					
June 25.....	Elbow River.....	Sec. 25-23-2-5.....	A. O. Wheeler....	647.4	
June 30.....	"	Sec. 13-24-4-5.....	T. D. Green.....	412.2	
October 3.....	"	Sec. 34-22-5-5.....	J. S. Dennis.....	210.5	
1895.					
June 29.....	"	Sec. 13-23-5-5.....	A. O. Wheeler....	761.3	
July 7.....	"	Sec. 11-23-5-5.....	A. O. Wheeler....	972.8	
July 20.....	"	Sec. 23-20-7-5.....	"	148.8	
1896.					
August 3.....	"	Sec. 1-20-8-5.....	"	37.5	
1898.					
June 17.....	"	Sec. 15-24-1-5.....	"	1,480.8	
1906.					
June 11.....	"	N.W. 25-23-2-5...	J. F. Hamilton...	1,619.0	
June 18.....	"	"	"	729.0	
October 29.....	"	Sec. 10-24-1-5.....	"	275.0	
1907.					
October 21.....	"	"	I. J. Walmsley...	349.3	
1908.					
May 7.....	"	N.W. 10-24-3-5...	P. M. Sauder.....	195.3	
1895.					
July 15.....	Elbow, Branch of.	N.W. 30-22-5-5...	A. O. Wheeler....	7.37	
July 20.....	"	N.E. 23-20-7-5.....	"	39.12	
July 25.....	"	S.W. 4-22-6-5.....	"	18.58	
1894.					
June 26.....	Fish Creek.....	Sec. 1-23-2-5.....	J. S. Dennis.....	16.1	Summer flow.
1906.					
June 13.....	"	Sec. 3-23-1-5.....	J. F. Hamilton...	87.7	
June 14.....	"	"	"	72.5	
June 16.....	"	Sec. 26-22-3-5.....	P. M. Sauder.....	42.7	
November 7....	"	"	"	14.9	
1894.					
July 10.....	Fish Creek, South Branch.....	Sec. 4-22-3-5.....	J. S. Dennis.....	3.7	
1895.					
August 14.....	"	S.W. 14-22-4-5....	A. O. Wheeler....	11.22	
August 20.....	"	S.E. "	"	3.91	

BOW RIVER DRAINAGE BASIN.—*Continued.*

DATE.	Stream.	Locality.	Hydrographer.	Discharge.	Remarks.
1906.				<i>Sec.ft.</i>	
June 18.....	Fish Creek, South Branch.....	Sec. 22-22-3-5.....	P. M. Sauder.....	7.5	
1907.					
May 13.....	"	"	I. J. Walmsley...	24.2	
October 17.....	"	"	"	11.81	
1894.					
July 7.....	Fish Creek, North Branch.....	Sec. 19-22-3-5.....	J. S. Dennis.....	2.7	
1895.					
August 7.....	"	S.W. 6-23-4-5.....	A. O. Wheeler....	1.86	
August 9.....	"	N.W. 25-22-4-5....	"	28.41	
1896.					
June 18.....	"	Sec. 22-22-3-5.....	P. M. Sauder.....	29.06	
1907.					
May 13.....	"	"	I. J. Walmsley...	16.9	
October 17.....	"	"	"	13.3	
1908.					
May 20.....	"	"	P. M. Sauder.....	91.07	
1895.					
July 23.....	Fisher Branch....	N.E. 18-21-7-5.....	A. O. Wheeler....	163.44	
1894.					
July 9.....	Highwood River..	Sec. 5-18-1-5.....	J. S. Dennis.....	893.7	Below Pekisko Creek.
July 9.....	"	Sec. 1-18-2-5.....	"	907.8	Above "
July 19.....	"	Sec. 32-20-28-4....	"	667.9	Below "
1897.					
August 13.....	"	Sec. 19-18-2-5.....	A. O. Wheeler....	466.4	Above "
September 13...	"	Sec. 35-16-5-5.....	"	109.05	
1906.					
July 10.....	"	Sec. 1-18-2-5.....	J. F. Hamilton...	841.0	
October 20.....	"	Sec. 22-21-28-4....	"	334.5	
1907.					
May 23.....	"	Sec. 1-18-2-5.....	I. J. Walmsley...	482.1	Above Pekisko Creek
October 4.....	"	"	"	706.1	
1909.					
September 13...	"	Sec. 7-19-28-4.....	J. S. Tempest....	246.6	
1894.					
June 26.....	Jumpingpound Ck	Sec. 31-24-4-5.....	J. S. Dennis.....	85.5	
June 27.....	"	"	"	65.0	
October 17.....	"	Sec. 3-24-5-5.....	"	24.6	
1895.					
June 13.....	"	Sec. 13-24-7-5.....	A. O. Wheeler....	67.12	
June 13.....	.. Jumpingpound, Branch of.....	N.E. 11-24-7-5.....	"	6.4	
June 24.....	"	S.E. 20-24-7-5.....	"	9.0	
June 25.....	"	N.W. 8-24-6-5.....	"	17.6	
June 26.....	"	N.E. 11-24-6-5.....	"	133.26	
1906.					
January 29.....	Kananaskis River.	Sec. 33-24-8-5.....	J. F. Hamilton...	165.0	Low water.
1909.					
June 5.....	Little Bow Ditch.	N.E. 1-19-29-4....	J. S. Tempest....	11.7	
June 7.....	"	S.W. 33-18-29-4...	"	6.2	
June 8.....	"	N.W. 30-18-29-4...	"	2.4	
1895.					
September 24...	Macabee Creek...	S.W. 30-19-3-5.....	A. O. Wheeler....	1.66	
1907.					
May 27.....	"	Sec. 29-19-3-5.....	P. M. Sauder.....	3.7	
1909.					
June 17.....	Meinsinger Creek.	S.E. 14-17-4-5.....	J. S. Tempest....	6.23	
1907.					
May 4.....	Nose Creek.....	N.W. 13-24-1-5...	I. J. Walmsley...	24.6	
October 23.....	"	"	"	5.3	
1894.					
September 1....	Nose Ck, W. Br'h.	Sec. 1-26-2-5.....	T. D. Green.....	0.77	
June 28.....	Pine Creek.....	Sec. 1-22-2-5.....	I. J. Walmsley...	0.0	
1895.					
July 25.....	Prairie Creek.....	S.E. 17-22-6-5.....	A. O. Wheeler....	21.02	Above junction of streams.
July 25.....	PrairieCk.,Br. of.	"	"	22.07	
1894.					
July 11.....	Pekisko Creek....	Sec. 36-17-2-5.....	"	23.5	
1906.					
July 9.....	"	"	J. F. Hamilton...	48.17	
1907.					
October 5.....	"	Sec. 25-17-2-5.....	I. J. Walmsley....	83.0	
1894.					
June 30.....	Spring Creek.....	Sec. 11-24-4-5.....	A. O. Wheeler....	22.3	
June 30.....	"	Sec. 13-24-4-5.....	"	1.5	
1909.					
May 29.....	"	N.E. 20-19-2-5....	J. S. Tempest....	0.23	Float measurement.
June 22.....	"	S.W. 24-17-4-5....	"	1.41	
July 22.....	"	S.W. 13-17-4-5....	"	0.35	
July 25.....	Small Creek.....	N.E. 26-13-30-4...	"	0.7	Weir measurement.
1894.					
June 30.....	Stream, small....	Sec. 11-24-4-5.....	T. D. Green.....	23.2	From Muskeg to Elbow.

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BOW RIVER DRAINAGE BASIN.—*Continued.*

DATE.	Stream.	Locality.	Hydrographer.	Discharge.	Remarks.
1894.				<i>Sec.-ft.</i>	
July 3.....	Sheep River.....	Sec. 25-20-2-5.....	J. S. Dennis.....	257.0	
July 23.....	".....	Sec. 24-20-29-4.....	".....	159.1	
July 12.....	Sheep River, N. Br.	N.E. 2-21-3-5.....	".....	3.0	
1906.					
June 21.....	".....	Sec. 7-21-2-5.....	J. F. Hamilton...	109.60	
June 23.....	".....	".....	".....	593.90	
1907.					
May 15.....	".....	S.E. 12-21-3-5.....	I. J. Walmsley....	162.7	
October 16.....	".....	".....	".....	78.12	
1895.					
August 27.....	Sheep, N. Branch of N. Fork.....	N.E. 1-21-5-5.....	A. O. Wheeler....	12.48	
September 16...	".....	S.E. 33-20-4-5.....	".....	8.52	
September 26...	Sheep Riv., S. Br.	Sec. 19-19-3-5.....	".....	171.35	
September 26...	".....	".....	".....	168.46	
October 3.....	".....	Sec. 29-19-5-5.....	".....	102.67	
October 6.....	".....	Sec. 15-19-6-5.....	".....	93.33	
1896.					
August 6.....	".....	Sec. 14-19-6-5.....	".....	304.37	
1906.					
June 25.....	".....	Sec. 17-20-2-5.....	J. F. Hamilton...	879.0	
June 25.....	".....	Sec. 6-20-2-5.....	P. M. Sauder.....	797.8	
1907.					
May 16.....	".....	Sec. 16-20-2-5.....	I. J. Walmsley...	476.3	
October 15.....	".....	".....	".....	197.8	
1895.					
August 22.....	Stream to N. Br. of Sheep River....	S.E. 34-21-3-5.....	A. O. Wheeler....	0.74	
September 11...	".....	S.E. 2-21-6-5.....	".....	1.12	
September 11...	".....	S.W. 1-21-6-5.....	".....	2.7	
September 24...	Stream to S. Br. of Sheep River....	N.W. 31-19-3-5...	".....	0.82	
September 30...	".....	S.E. 30-19-4-5.....	".....	19.94	
October 3.....	".....	S.W. 32-19-5-5.....	".....	14.66	
October 6.....	".....	S.W. 14-19-6-5.....	".....	4.51	
October 6.....	".....	S.E. 15-19-6-5.....	".....	23.61	
October 8.....	".....	S.W. 34-19-5-5.....	".....	9.37	
October 2.....	".....	S.E. 21-19-4-5.....	".....	2.13	
1894.					
July 13.....	Stimson Creek....	Sec. 4-17-2-5.....	".....	3.9	
1906.					
July 9.....	".....	Sec. 5-17-2-5.....	J. F. Hamilton...	28.81	
1907.					
October 5.....	".....	".....	I. J. Walmsley...	37.0	
1909.					
September 10...	Trap Creek.....	Sec. 8-18-4-5.....	J. S. Tempest....	24.24	
1906.					
July 6.....	Tongueflag Creek..	Sec. 19-19-28-4....	J. F. Hamilton...	7.3	
1907.					
May 20.....	".....	".....	I. J. Walmsley....	14.2	
October 7.....	".....	".....	".....	6.7	
1895.					
September 22...	Ware Creek.....	Sec. 20-20-4-5.....	A. O. Wheeler....	5.8	
September 22...	Ware Creek, Br. of	".....	".....	0.84	

CRANE LAKE DRAINAGE BASIN.

1896.					
September 21...	Bear Creek.....	Sec. 19-11-23-3....	James Gibbons ...	13.09	
1907.					
July 3.....	".....	S.W. 30-11-23-3...	R. J. Burley.....	32.73	
1907.					
June 12.....	Bear Creek, E. Br.	N.E. 29-10-23-3...	".....	10.27	
1908.					
June 19.....	".....	Sec. 29-10-23-3....	".....	3.05	
October 27.....	".....	".....	F. T. Fletcher....	4.04	
1909.					
July 8.....	".....	S.E. 29-10-23-3....	R. J. Burley.....	17.73	
1907.					
June 11.....	Bear Creek, W. Br.	N.W. 29-10-23-3...	".....	14.85	
1909.					
July 8.....	".....	S.W. ".....	".....	28.44	
1896.					
September 21...	Piapot Creek.....	Sec. 18-11-24-3....	James Gibbons...'	1.74	Low water.
1906.					
June 21.....	".....	Sec. 36-10-25-3....	R. J. Burley.....	9.86	"
1907.					
June 20.....	".....	".....	".....	14.4	
1908.					
June 17.....	".....	Sec. 19-10-24-3....	F. T. Fletcher....	0.94	Weir measurement.
October 19.....	".....	Sec. 8-10-24-3....	".....	2.69	

CRANE LAKE DRAINAGE BASIN.—Continued.

DATE.	Stream.	Locality.	Hydrographer.	Discharge.	Remarks.
1908.				<i>Sec.-ft.</i>	
October 24.....	Piapot, E. Branch	Sec. 19-10-24-3....	F T. Fletcher.....	1.05	
October 24.....	Piapot, W. Branch.	.....	.....	2.17	
1896.					
September 21...	Skull Creek.....	Sec. 7-12-22-3.....	James Gibbons....	0.5	Low water.
1907.					
July 13.....	"	S.E. 34-10-22-3....	R. J. Burley.....	5.27	
1909.					
July 21.....	"	Sec. 32-10-22-3....	"	3.04	
August 2.....	" .....	.....	.....	2.49	

FRENCHMAN RIVER DRAINAGE BASIN.

1897.					
July 22.....	Belanger Creek....	Sec. 25-6-26-3.....	R. W. MacIntyre.	7.29	
1907.					
August 23.....	"	Sec. 6-7-25-3.....	R. J. Burley.....	4.57	
1909.					
September 14..	"	S.E. 14-8-26-3.....	F. T. Fletcher....	2.51	
August 24.....	Blacktail Creek ..	Sec. 30-6-23-3.....	"	0.23	
August 21.....	Calf Creek.....	Sec. 5-8-22-3.....	"	1.55	
September 13...	Dip Creek.....	S.E. 7-8-25-3.....	"	0.26	Weir measurement.
August 23.....	Doyles Coulee....	N.W. 17-7-22-3....	"	0.22	"
1907.					
August 23.....	Davis Creek.....	Sec. 27-7-25-3.....	R. J. Burley.....	No flow.	
1908.					
June 19.....	"	"	F. T. Fletcher....	3.05	
1909.					
September 13...	"	N.E. 21-8-25-3....	"	3.5	
1896.					
September 17...	Frenchman River.	Sec. 29-6-21-3.....	R. W. MacIntyre.	23.2	Low water.
1907.					
July 30.....	"	N.W. 24-6-23-3...	R. J. Burley.....	32.5	"
1909.					
August 19.....	"	Sec. 31-6-21-3.....	F. T. Fletcher....	13.84	
1907.					
July 31.....	Frenchman River, N. Branch.....	Sec. 15-7-22-3.....	R. J. Burley.....	6.84	
1909.					
August 23.....	"	S.E. 16-7-22-3.....	R. J. Burley.....	5.45	
August 23.....	" .....	.....	.....	5.33	
1908.					
August 7.....	Fairwell Creek....	Sec. 7-8-23-3.....	F. T. Fletcher....	Nil	
August 7.....	Fairwell Creek, W. Branch.....	Sec. 9-8-24-3.....	"	Nil	
1909.					
September 8....	"	Tp. 8, Rge.23-W.3	"	0.87	
September 8....	" E. Branch	.....	" .....	0.89	
September 8....	" E. Branch	"	"	0.40	
1908.					
August 17.....	Lone Pine Creek..	Sec. 27-7-26-3.....	"	0.6	Weir measurement.
August 17.....	" ..	.....	" .....	0.63	
1909.					
September 12...	" ..	Sec. 14-7-26-3.....	"	0.38	Weir measurement.
1907.					
August 23.....	Sucker Creek.....	Sec. 16-7-26-3.....	"	1.05	
1908.					
August 22.....	" ..	Tp. 6, Rge 26-W.3	"	Dry.	
July 20.....	Spring Creek.....	Sec. 18-7-22-3.....	"	0.28	
July 20.....	"	Sec. 17-7-22-3.....	"	0.28	
1909.					
August 23.....	"	Sec. 18-7-22-3.....	"	0.12	Weir measurement.
1908.					
August 22.....	Warlodge Creek...	Sec. 14-7-27-3.....	"	0.12	"
August 22.....	" Br. of..	"	"	0.15	"
1909.					
September 8....	" " ..	"	"	0.22	"

HAY LAKE DRAINAGE BASIN.

1896					
Sept. 19.....	Hay Creek.....	Sec. 30-10-25-3....	R. W. MacIntyre.	0.73	
1906					
June 30.....	"	Sec. 29-10-25-3....	R. J. Burley.....	8.42	
1907					
June 20.....	"	"	"	13.3	
Sept. 6.....	"	"	"	1.2	

HAY LAKE DRAINAGE BASIN.—Continued.

Date	Stream	Locality	Hydrographer	Discharge	Remarks.
1908				<i>Sec.-ft.</i>	
May 12.....	Hay Creek.....	Sec. 29-10-25-3....	R. J. Burley.....	1.0	Weir measurement.
May 13.....	".....	".....	".....	0.96	
October 16.....	".....	Between Tps. 11-12 Rge. 25-3.....	F. T. Fletcher.....	0.15	Weir measurement.
1909					
July 2.....	".....	S.W. 29-10 25-3....	R. J. Burley.....	1.12	" "
April 26.....	Saunders Spg. C'k.	S.E. 20-10-25-3....	P. M. Sauder.....	0.32	At intake Maple Ck. W.Wks.
April 29.....	" "	N.W. 20-10-25-3....	".....	0.33	At Reservoir Maple. Ck. W. Wks.
1909					
May 15.....	" "	SE. 20-10-25-3....	R. J. Burley.....	0.63	At intake Maple Ck. W. Works.
June 26.....	" "	".....	".....	0.8	" "
July 2.....	" "	N.W. 20-10-25-3....	".....	0.7	Below Maple Ck. W. Works overflow. *
July 2.....	" "	".....	".....	0.08	Above " " *
July 2.....	" "	".....	".....	0.19	Below " " *
July 3.....	" "	".....	".....	0.79	Below " " *
July 3.....	" "	".....	".....	0.07	Above " " *
July 4.....	" "	".....	".....	0.81	Below " " *
July 4.....	" "	".....	".....	0.17	Above " " *
July 5.....	" "	".....	".....	1.34	Below " " *
July 5.....	" "	".....	".....	1.05	Above " " *
September 3.....	" "	S.E. 20-10-25-3....	R. J. Burley & P. M. Sauder.....	0.8	At Intake Maple Ck. W. Works.*
September 3.....	" "	N.W. 20-10-25-3....	".....	0.47	Below overflow. *
Spetember 3.....	" "	".....	".....	0.03	Above " " *
October 1.....	" "	".....	R. J. Burley.....	0.38	Below " " *
October 1.....	" "	".....	".....	Nil.	Above Maple Creek overflow too small to measure.*

* Weir measurements.

LITTLE BOW RIVER DRAINAGE BASIN.

1894					
August 2.....	Little Bow River..	Sec. 1-18-28-4.....	J. S. Dennis.....	3.1	Low water
1907					
May 27.....	" "	Sec. 6-19-28-4.....	I. J. Walmsley....	2.0	Partly supplied by Highwood River.
June 4.....	" "	Sec. 12-15-26-4....	".....	14.0	
September 29....	" "	Sec. 19-16-26-4....	".....	11.5	
1909					
June 9.....	" "	Sec. 29-18-28-4....	J. S. Tempest.....	16.07	
June 9.....	" "	Sec. 20-19-28-4....	".....	16.7	
June 28.....	" "	Sec. 1-14-25-4....	".....	57.39	
June 29.....	" "	Sec. 31-13-23-4....	".....	53.55	
June 29.....	" "	Sec. 31-16-26-4....	".....	17.77	
1907					
October 7.....	Ditch Feeding Little Bow.....	Sec. 6-19-28-4.....	I. J. Walmsley....	0.9	
1894					
July 20.....	Mosquito Creek...	Sec. 35-16-29-4....	A. O. Wheeler.....	.....	Creek not flowing.
July 23.....	".....	Sec. 12-16-28-4....	".....	.....	" "
August 1.....	".....	".....	".....	.....	" "
1906					
July 14.....	".....	Sec. 28-16-28-4....	J. F. Hamilton....	35.55	
July 25.....	".....	Sec. 11-15-26-4....	P. M. Sauder.....	36.8	
1907					
June 4.....	".....	Sec. 12-15-26-4....	I. J. Walmsley....	30.2	
June 8.....	".....	Sec. 28-16-28-4....	".....	13.6	
September 25....	".....	".....	".....	14.8	
1896					
October 22.....	Nanton Creek.....	Sec. 26-15-29-4....	A. C. Talbot.....	0.82	
1906					
July 14.....	".....	Sec. 21-16-28-4....	J. F. Hamilton....	21.97	
1907					
June 8.....	".....	".....	I. J. Walmsley....	6.0	
September 25....	".....	".....	".....	4.82	
1909					
July 7.....	Springhill Creek...	Sec. 3-16-29-4....	J. S. Tempest.....	1.06	
July 12.....	Springhill Ck., Br. of.....	".....	".....	0.8	

LODGE CREEK DRAINAGE BASIN.

Date.	Stream.	Locality.	Hydrographer.	Discharge	Remarks.
1897				<i>Sec.-ft.</i>	
July 13.....	Lodge Creek.....	Sec. 36-4-2-4.....	R. W. MacIntyre..	1.63	
1908					
September 19...	"	Sec. 25-2-30-3.....	F. T. Fletcher.....	Nil.	Water in pools.
November 9.....	"	N.W. 29-5-2-4.....	R. J. Burley.....	Nil.	
1909					
July 14.....	"	N.W.29-7-3-4.....	F. T. Fletcher.....	0.14	Weir measurement.
July 22.....	"	Sec. 15-6-3-4	"	Dry.	
July 22.....	"	Sec. 27-6-3-4.....	"	Dry.	
1897					
July 7.....	Lodge Ck. E. Bran.	Sec. 13-7-3-4.....	R. W. MacIntyre..	5.34	
1909					
July 22.....	" "	Sec. 22-6-3-4.....	F. T. Fletcher.....	Dry	
1906					
August.....	Middle Creek.....	Sec. 8-4-29-3.....	R. J. Burley.....	0.63	
1908					
September 19...	"	Sec. 9-4-29-3.....	F. T. Fletcher.....	Nil	
September 21...	"	Sec. 17-4-29-3.....	"	Nil	
1909					
July 21.....	" ...	Sec. 36-5-2-4.....	"	Dry	
October 26.....	"	Sec. 22-5-30-3.....	R. J. Burley.....	Dry	
May 31.....	Spring Creek.....	Sec. 33-6-2-4.....	"	0.818	Weir measurement.
May 31.....	" ...	N.E. 29-6-2-4.....	"	0.08	

MANY ISLAND LAKE DRAINAGE BASIN.

1909					
June 25.....	Boxelder Creek....	N.W. 24-12-30-3...	F. T. Fletcher.....	17.79	
June 24.....	Mackay Creek....	N.W. 26-11-1-4....	F. T. Fletcher.....	48.66	
July 29.....	"	"	"	0.64	

OLDMAN RIVER DRAINAGE BASIN.

1896					
October 31.....	Beaver Creek.....	Tp. 9, Rge. 29-W-4	A. C. Talbot.....	4.77	
1906					
July 26.....	"	Near mouth on Peigan Res....	J. F. Hamilton....	24.92	
August 1.....	"	S.W. 2-9-29-4.....	P. M. Sauder.....	21.3	
1907					
June 29.....	"	Near Mouth on Peigan Res.....	I. J. Walmsley....	79.2	
1909					
August 22.....	"	N.E. 36-9-30-4.....	J. S. Tempest.....	6.34	
1906					
July 19.....	Burton Creek.....	Sec. 14-12-1-5.....	P. M. Sander	15.3	
July 20.....	Burke Creek.....	Sec. 36-11-30-4....	"	5.0	
1907					
August 31.....	Byron Creek.....	Sec. 17-7-3-5.....	I. J. Walmsley....	12.9	
September 2.....	Blairmore Creek...	Tp. 8.;Rgc. 4 W-5.	"	21.3	
1896					
November 3.....	Cow Creek.....	Sec. 34-8-2-5.....	A. C. Talbot.....	2.99	
1906					
August 4.....	"	Sec. 12-8-2-5.....	P. M. Sauder.....	2.4	
1907					
July 7.....	"	Sec. 6-8-1-5.....	I. J. Walmsley....	23.0	
August 29.....	"	"	"	9.3	
1909					
August 24.....	"	Sec. 12-8-2-5.....	J. S. Tempest.....	4.2	
1896					
November 4.....	Connelly Creek....	Sec. 34-7-2-5.....	A. C. Talbot.....	1.15	
1906					
August 4.....	" ...	Sec. 36-7-2-5.....	P. M. Sauder.....	1.0	
1907					
July 7.....	" ...	"	I. J. Walmsley....	11.7	
August 29.....	" ...	"	"	3.5	
1906					
August 9.....	Crowsnest River...	Sec. 29-7-1-5.....	J. F. Hamilton....	161.7	
1907					
July 3.....	" ...	"	I. J. Walmsley....	957.2	
September 3.....	" ...	"	"	503.7	
1906					
August 7.....	Callum Creek.....	Sec. 31-10-1-5.....	P. M. Sauder.....	10.5	
1907					
August 21.....	"	"	I. J. Walmsley...	6.5	
1909					
August 16.....	"	Sec. 36-11-2-5.....	J. S. Tempest.....	1.33	
August 18.....	"	Sec. 31-10-1-5.....	"	4.33	

SESSIONAL PAPER No. 25d

OLDMAN RIVER DRAINAGE BASIN.—*Continued.*

Date.	Stream.	Locality.	Hydrographer.	Discharge.	Remarks.
1909				<i>Sec.-ft.</i>	
August 16.....	Callum Creek, Br.				
	of.....	S.W. 6-12-1-5.....	J. S. Tempest.....	0.57	
August 16.....	"	S.E. 7-12-1-5.....	"	0.63	
1906					
August 6.....	Cabin Creek.....	Sec. 3-9-1-5.....	P. M. Sauder.....	Dry.	
1907					
August 19.....	"	"	I. J. Walmsley.....	0.7	
August 28.....	Canyon Creek.....	Sec. 14-6-2-5.....	"	14.6	
1906					
August 8.....	Damon Creek.....	N.E. 18-11-2-5.....	P. M. Sauder.....	1.0	
1907					
August 21.....	"	"	I. J. Walmsley.....	0.7	
1906					
July 31.....	Five Mile Creek...	Sec. 22-9-29-4.....	P. M. Sauder.....	7.8	
1909					
August 22.....	"	S. W. 15-9-29-4....	J. S. Tempest.....	1.0	Weir measurement.
1907					
August 31.....	Gold Creek.....	Sec. 31-8-3-5.....	I. J. Walmsley.....	45.3	
1896					
November 2.....	Heath Creek.....	Sec. 33-9-1-5.....	A. C. Talbot.....	3.86	
1906					
August 6.....	"	Sec. 4-10-1-5.....	P. M. Sauder.....	5.8	
1907					
August 20.....	"	Sec. 3-10-1-5.....	I. J. Walmsley.....	5.6	
1909					
August 19.....	"	N.E. 32-9-1-5.....	J. S. Tempest.....	4.05	
1896					
October 23.....	Kuntz Creek.....	Sec. 14-14-30-4....	A. C. Talbot.....	0.69	
1907					
June 6.....	"	Sec. 18-14-29-4....	I. J. Walmsley.....	0.3	Below G. Lane's int'e.
June 6.....	"	"	"	2.7	Above "
1909					
July 24.....	"	Sec. 20-14-29-4....	J. S. Tempest.....	1.93	
July 27.....	"	N.W. 11-14-30-4...	"	1.93	
1906					
July 30.....	Kyiskap Creek....	Sec. 2-10-27-4.....	J. F. Hamilton....	2.3	
1907					
June 20.....	"	"	I. J. Walmsley.....	1.9	
September 2.....	Lyon Creek.....	Sec. 35-7-4-5.....	"	27.7	
1906					
July 21.....	Lyndon Creek.....	Sec. 11-12-29-4....	P. M. Sauder.....	17.7	
1907					
June 14.....	"	"	I. J. Walmsley.....	26.6	
September 23....	"	"	"	6.6	
1906					
August 6.....	Meadow Creek....	Sec. 7-10-1-5.....	P. M. Sauder.....	Dry.	
1907					
August 20.....	"	"	I. J. Walmsley.....	0.4	
1896.					
October 28.....	Muddypound Ck..	Sec. 14-11-28-4....	A. C. Talbot.....	2.82	S. Br. of Muddypound
1906.					
July 19.....	"	Sec. 25-11-28-4....	J. F. Hamilton....	9.2	
1907.					
June 11.....	"	"	I. J. Walmsley...	8.3	Below intake.
June 15.....	"	Sec. 27-11-28-4....	"	10.4	
1906.					
August 8.....	Mill Creek.....	Sec. 19-6-1-5.....	J. F. Hamilton....	46.4	
1907.					
July 8.....	"	Sec. 18-6-1-5.....	I. J. Walmsley...	271.7	
August 17.....	"	"	"	48.9	
1906.					
August 6.....	Mead Creek.....	Sec. 7-10-1-5.....	P. M. Sauder.....	Dry	
1907.					
August 20.....	"	"	I. J. Walmsley...	0.3	
September 2.....	McGillivary Ck...	Sec. 8-8-4-5.....	"	17.9	
1906.					
August 1.....	Nine mile Creek..	Sec. 1-9-29-4.....	P. M. Sauder.....	1.2	
1909.					
August 22.....	"	"	J. S. Tempest....	0.25	Weir measurement.
1907.					
September 2.....	Nez. Percee Ck...	Sec. 17-8-4-5.....	I. J. Walmsley...	7.1	
1894.					
August 9.....	Oldman River....	Sec. 20-9-25-4.....	A. O. Wheeler....	1,078.0	Mean.
1895.					
August 28.....	"	Sec. 36-7-1-5.....	T. D. Green.....	70.27	North fork.
1906.					
July 25.....	"	Sec. 10-9-26-4.....	J. F. Hamilton...	1,229.6	High water.
July 31.....	"	"	"	1,013.9	"
August 10.....	"	Sec. 34-7-1-5.....	"	258.8	Low water.
October 2.....	"	Sec. 10-9-26-4.....	"	528.4	
1907.					
June 25.....	"	"	P. M. Sauder &	10,722.4	
			I. J. Walmsley...		
September 14...	"	"	I. J. Walmsley...	1,569.2	
September 20...	"	"	"	2,994.0	

OLDMAN RIVER DRAINAGE BASIN.—Continued.

DATE.	Stream.	Locality.	Hydrographer.	Discharge.	Remarks.
July 4.....	Oldman River.....	Sec. 34-7-1-5.....	I. J. Walmsley....	<i>Sec.-ft.</i> 3,124.7	North fork.
August 23.....	".....	".....	".....	486.8	
1909.					
August 19.....	".....	Sec. 6-10-1-5.....	J. S. Tempest....	352.5	
August 25.....	".....	S.W. 32-7-1-5.....	".....	278.78	
1906.					
August 6.....	Olin Creek.....	Sec. 22-9-1-5.....	P. M. Sauder.....	1.4	
1907.					
August 20.....	".....	Sec. 16-9-1-5.....	I. J. Walmsley....	1.1	
1909.					
August 19.....	".....	S.E. 15-9-1-5.....	J. S. Tempest....	0.6	
1906.					
July 30.....	Olson Creek.....	Sec. 2-9-28-4.....	P. M. Sauder.....	1.1	
1907.					
June 29.....	".....	On Peigan Reserve	I. J. Walmsley....	1.6	
1906.					
July 7.....	Oxley Creek.....	S.W. 25-14-29-4...	P. M. Sauder.....	13.9	
1907.					
June 5.....	".....	Sec. 26-14-29-4...	I. J. Walmsley....	3.4	
1909.					
July 22.....	".....	S.W. 7-14-28-4....	J. S. Tempest....	3.86	
1906.					
July 20.....	Patterson Creek...	Sec. 36-11-30-4....	P. M. Sauder.....	4.3	
1894.					
October 22.....	Pincher Creek....	Sec. 12-7-29-4.....	A. O. Wheeler....	19.8	
1895.					
August 29.....	".....	N.E. 4-7-29-4.....	T. D. Green.....	4.99	
1906.					
August 8.....	Playle Creek.....	Sec. 30-11-1-5.....	P. M. Sauder.....	1.1	
1907.					
August 21.....	".....	".....	I. J. Walmsley....	0.6	
June 5.....	Pine Coulee.....	Sec. 10-15-28-4....	".....	0.7	
September 29...	".....	".....	".....	0.4	
August 29.....	Rock Creek.....	Sec. 29-7-2-5.....	".....	5.4	
1906.					
July 20.....	Stewart Creek....	Sec. 36-11-30-4....	P. M. Sauder.....	7.1	
August 7.....	Sharples Creek....	N.E. 31-10-1-5....	".....	3.8	
1907.					
August 21.....	".....	".....	I. J. Walmsley....	3.0	
1909.					
August 18.....	".....	".....	J. S. Tempest....	5.3	Weir measurement.
1895.					
August 29.....	South Fork River.	Sec. 25-7-1-5.....	T. D. Green.....	303.35	
1906.					
Aug. 11.....	".....	Sec. 2-7-1-5.....	J. F. Hamilton...	270.1	
1907.					
July 2.....	".....	".....	I. J. Walmsley....	3,240.1	
August 26.....	".....	".....	".....	653.1	
1909.					
August 28.....	".....	S.E. 34-6-1-5.....	J. S. Tempest....	315.98	
July 25.....	Spring Creek.....	S.E. 35-13-30-4....	".....	0.15	Weir measurement.
July 27.....	".....	S.W. 2-14-1-5.....	".....	0.09	"
July 27.....	Small Creek.....	N.E. 27-13-1-5....	".....	0.83	"
July 28.....	Two Springs.....	N.W. 35-13-1-5...	".....	0.18	"
1896.					
October 28.....	Trout Creek.....	Sec. 12-12-28-4....	A. C. Talbot.....	17.19	Low water.
1906.					
July 21.....	".....	Sec. 2-12-29-4.....	P. M. Sauder.....	40.4	High water.
July 19.....	".....	Sec. 2-12-28-4.....	J. F. Hamilton...	81.59	"
1907.					
June 11.....	".....	".....	I. J. Walmsley....	56.1	Below ditches.
June 13.....	".....	Sec. 2-12-29-4....	".....	121.9	Above ditches.
June 14.....	".....	".....	".....	38.3	Above Lyndon Creek.
September 23...	".....	".....	".....	14.0	"
September 24...	".....	Sec. 12-12-28-4....	".....	21.3	Below ditches.
1909.					
August 6.....	".....	".....	J. S. Tempest....	27.86	
1896.					
October 26.....	Trout Ck., S. Br.	Sec. 2-12-29-4.....	A. C. Talbot.....	12.12	Low water.
1906.					
July 20.....	".....	Sec. 6-12-29-4....	P. M. Sauder.....	16.8	
1909.					
August 11.....	".....	S.E. 11-12-29-4....	J. S. Tempest....	16.76	
1896.					
October 24.....	Trout Ck., N. Br.	Sec. 26-12-29-4....	A. C. Talbot.....	8.82	
1909.					
August 5.....	".....	S.W. 34-12-29-4...	J. S. Tempest....	6.44	
August 11.....	".....	S.E. 11-12-29-4....	".....	5.83	
August 11.....	Trout Ck., Br. of..	N.W. 1-12-28-4....	".....	0.94	Weir measurement.
November 3....	Todd Creek.....	Sec. 5-9-2-5.....	A. C. Talbot.....	4.25	
1906.					
August 4.....	".....	Sec. 7-8-1-5.....	P. M. Sauder.....	11.7	Low water.
1907.					
July 7.....	".....	".....	I. J. Walmsley....	45.8	
August 29.....	".....	".....	".....	44.4	

SESSIONAL PAPER No. 25d

OLDMAN RIVER DRAINAGE BASIN.—*Continued.*

DATE.	Stream.	Locality.	Hydrographer.	Discharge.	Remarks.
1909.				<i>Sec.-ft.</i>	
July 28.....	"	Sec. 36-8-2-5.....	J. S. Tempest....	11.4	
August 24.....	"	N.W. 30-8-1-5.....	"	4.98	
1906.					
August 2.....	Tennessee Creek..	Sec. 23-8-30-4.....	P. M. Sauder.....	2.7	
1907.					
August 19.....	"	"	I. J. Walmsley ...	2.0	
1894.					
July 25.....	Willow Creek.....	Sec. 23-13-28-4....	A. O. Wheeler....	25.8	
August 10.....	"	Sec. 24-9-26-4.....	"	39.6	
1906.					
July 16.....	"	Sec. 7-12-27-4.....	P. M. Sauder.....	208.1	
July 18.....	"	"	"	255.2	
July 18.....	"	"	J. F. Hamilton...	258.0	
July 20.....	"	Sec. 31-9-26-4.....	"	169.6	
July 22.....	"	"	"	262.3	
July 31.....	"	"	"	283.4	
October 3.....	"	"	"	70.9	
1907.					
June 12.....	"	Sec. 7-12-27-4.	I. J. Walmsley...	385.3	
June 13.....	"	"	"	389.7	
June 27.....	"	Sec. 31-9-26-4.....	"	1,318.8	
September 24...	"	Sec. 7-12-27-4.....	"	290.2	
1909.					
July 29.....	"	S.E. 2-14-30-4.....	J. S. Tempest....	208.7	
August 6.....	"	N.E. 7-12-28-4.....	"	107.1	
1907.					
September 2....	York Creek.....	Sec. 34-7-4-5.....	I. J. Walmsley....	46.5	

PAKOWKI LAKE DRAINAGE BASIN.

1909.					
July 7.....	Canal Creek.....		F. T. Fletcher....	Dry.	
July 9.....	Manyberries Ck..		"	0.33	Weir measurement.

RED DEER RIVER DRAINAGE BASIN.

1894.					
September 14...	Beaverdam Creek.	Sec. 36-28-3-5.....	T. D. Green.....	2.7	
1896.					
June 3.....	"	Sec. 35-29-3-5.....	A. C. Talbot.....	7.94	
1909.					
.....	Berry Creek.....	Sec. 27-23-13-4....	J. Stewart.....	6.31	
1894.					
September 19...	Dogpound Creek..	Sec. 33-28-4-5.....	T. D. Green.....	2.4	
1896.					
June 2.....	"	Sec. 33-29-3-5.....	A. C. Talbot.....	13.9	
June 9.....	"	Sec. 34-30-3-5.....	"	16.0	
June 16.....	"	Sec. 34-31-3-5.....	"	13.6	
June 23.....	"	Sec. 33-32-3-5.....	"	7.5	
June 29.....	"	Sec. 13-29-4-5.....	"	13.6	
1894.					
October 13.....	Little Red Deer River.....	Sec. 18-34-2-5.....	T. D. Green.....	30.1	
1896.					
June 27.....	"	Sec. 4-33-2-5.....	A. C. Talbot.....	51.36	
1894.					
October 16.....	Red Deer River...	Sec. 27-35-3-5.....	T. D. Green.....	539.9	Low water.
1896.					
August 18.....	"	Sec. 26-33-5-5.....	A. St. Cyr.....	1,001.4	"

ROSS CREEK DRAINAGE BASIN.

1907.					
May 24.....	Bullshead Creek...	Sec. 16-11-5-4.....	R. J. Burley.....	10.09	
1909.					
June 29.....	"	N.E. 3-12-5-4.....	F. T. Fletcher....	3.86	
July 1.....	"	S.E. 16-9-5-4.....	"	1.81	
July 26.....	"	"	"	0.22	
1909.					
July 14.....	Gros. Ventre Creek	N.E. 30-8-3-4.....	"	1.32	
July 29.....	"	Sec. 14-11-3-4.....	"	2.25	
June 28.....	Ross Creek.....	N.W. 31-11-2-4....	F. T. Fletcher....	20.38	
June 30.....	"	S.W. 28-12-5-4....	"	24.12	
July 15.....	"	At Elkwater Lake	"	Dry.	
July 15.....	"	N.E. 1-9-3-4.....	"	4.98	
July 28.....	"	N.W. 31-11-2-4....	"	1.27	

SEVENPERSONS RIVER DRAINAGE BASIN.

DATE.	Stream.	Locality.	Hydrographer.	Discharge.	Remarks.
1909.				Sec.-ft.	
July 5.....	Peigan Creek.....	Sec. 23-7-7-4.....	F. T. Fletcher....	0.1	
June 30.....	Sevenpersons River	N.W. 29-12-5-4....	"	10.29	
July 5.....	"	S.E. 9-8-8-4.....	"	0.25	
July 15.....	Spring Creek.....	N.W. 29-12-5-4....	"	1.35	

ST. MARY RIVER DRAINAGE BASIN.

1907.					
August 5.....	Alberta Railway & Irrigation Co's. Canal.....	Sec. 21-2-24-4.....	I. J. Walmsley....	357.5	
1906.					
September 14...	Boundary Creek..	S.W. 20-1-26-4....	P. M. Sauder.....	3.1	
1907.					
July 29.....	"	"	"	18.5	
August 6.....	"	Sec. 1-1-26-4.....	I. J. Walmsley...	14.95	
1906.					
September 15...	Lee Creek.....	Sec. 12-2-27-4.....	P. M. Sauder.....	27.1	
September 21...	"	N.E. 9-3-25-4.....	J. F. Hamilton...	19.22	
1907.					
July 29.....	"	Sec. 12-2-27-4.....	I. J. Walmsley....	80.4	
August 1.....	"	N.E. 9-3-25-4.....	"	53.0	
August 10.....	"	"	"	73.5	
1909.					
September 28...	"	N.W. 10-3-25-4...	J. S. Tempest....	42.57	
1906.					
September 11...	Rolph Creek.....	Sec. 22-1-24-4.....	P. M. Sauder.....	Dry.	
1907.					
August 5.....	"	Sec. 21-2-24-4.....	I. J. Walmsley...	0.86	
1895.					
July 19.....	St. Mary River...	N.E. 18-2-24-4....	J. S. Dennis.....	2,202.3	
1907.					
August 6.....	Snake Creek.....	Sec. 30-2-24-4.....	P. M. Sauder.....	0.0	Water in pools.

SWIFTCURRENT CREEK DRAINAGE BASIN.

1909.					
August 17.....	Jones Coulee.....	Sec. 17-8-20-3.....	R. J. Burley.....	0.53	Weir measurements.
August 4.....	McNicolls Creek..	N.E. 21-7-21-3....	"	0.19	
1896.					
September 24...	Swiftcurrent Creek	Sec. 19-15-13-3....	J. Gibbons.....	24.73	
1907.					
July 15.....	"	Sec. 27-7-21-3.....	R. J. Burley.....	1.25	
1909.					
August 2.....	"	"	"	2.49	
August 19.....	"	Sec. 22-7-21-3.....	F. T. Fletcher....	1.06	
August 17.....	Spring Creek.....	Sec. 17-8-20-3.....	"	0.08	
August 19.....	Sexton Creek.....	N.W. 21-7-21-3...	"	0.41	

WATERTON RIVER DRAINAGE BASIN.

1907.					
August 14.....	Backfat Creek....	Sec. 3-6-27-4.....	I. J. Walmsley....	No flow.	
1906.					
September 5....	Blakiston Brook...	Sec. 4-2-30-4.....	J. F. Hamilton...	54.46	Known as Pass Creek.
1907.	"	"	"	270.5	
1906.					
September 10...	Cottonwood Ck...	Sec. 20-2-29-4.....	"	4.1	
1907.					
July 17.....	"	"	I. J. Walmsley....	18.4	
July 17.....	Cottonwood Creek, Branch of.....	"	"	17.8	
1906.					
September 3....	Crooked Creek....	Sec. 16-2-29-4.....	J. F. Hamilton...	8.0	
July 23.....	"	Sec. 22-2-29-4.....	I. J. Walmsley....	36.3	
August 27.....	Drywood Creek...	Sec. 17-4-29-4.....	J. F. Hamilton...	225.8	
August 30.....	"	"	"	123.9	
1907.					
July 11.....	"	"	I. J. Walmsley....	154.1	
August 14.....	Foothill Creek....	Sec. 29-5-27-4.....	"	2.2	
1906.					
September 7...	Lost Creek.....	Sec. 20-1-29-4.....	J. F. Hamilton...	11.16	

SESSIONAL PAPER No. 25d

WATERTON RIVER DRAINAGE BASIN.—*Continued.*

DATE.	Stream.	Locality.	Hydrographer.	Discharge.	Remarks.
1907.					
July 22.....	Lost Creek	Sec. 20-1-29-4.....	I. J. Walmsley....	71.7	
July 23.....	Little Crooked Ck.	Sec. 22-2-29-4.....	I. J. "	5.05	
1906.					
September 12...	Oil Creek.....	Sec. 23-1-30-4.....	J. F. Hamilton...	29.41	
1907.					
July 18.....	"	"	I. J. Walmsley....	216.1	
1906.					
September 4....	Pine Creek.....	Sec. 21-3-29-4.....	J. F. Hamilton...	12.8	
1907.					
July 13.....	"	"	I. J. Walmsley....	41.3	
1894.					
August 16.....	Waterton River...	Sec. 13-6-26-4.....	A. O. Wheeler....	611.9	
September 4....	"	Sec. 1-3-29-4.....	"	501.9	
1906.					
September 6...	"	Sec. 8-2-29-4.....	J. F. Hamilton...	648.6	
September 26...	"	Sec. 20-5-27-4.....	"	300.2	
1907.					
August 15.....	"	Sec. 20-5-27-4.....	I. J. Walmsley....	885.9	
1906.					
August 25.....	Yarrow River.....	Sec. 8-24-9-4.....	J. F. Hamilton...	526.9	
August 28.....	"	"	"	243.8	
August 30.....	"	"	"	121.1	
1907.					
July 11.....	"	"	I. J. Walmsley....	207.8	

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